THE ROLE OF ILLUSTRATED ARATEA MANUSCRIPTS IN THE TRANSMISSION OF ASTRONOMICAL KNOWLEDGE IN THE MIDDLE AGES

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The *Aratea* manuscripts contain Latin translations of the astronomical poem originally written in Greek by Aratus of Soli around 270 BCE. The Greek poem was translated into Latin by three Roman authors: Cicero, Germanicus and Avienus. These three Latin versions became quite popular in the Middle Ages and were usually decorated with pictures of the full cycle of constellations, a celestial map, and personifications of the Sun, Moon and planets. In undertaking this study, essential questions needed to be answered, such as: how many manuscripts survive and from what time periods? How are the three different authors illustrated? What were their models? Are there patterns to be discovered in the illustrations of each author? Are the illuminators reading the poem and creating images in accordance with their readings or simply following ancient models? Who was the intended audience?

This body of Latin manuscripts, correctly called *Aratea*, had not been studied in its entirety, nor was there a catalog or listing of pertinent information. Were *Aratea* manuscripts produced, collected and read for their poetic content, mythological content, astronomical content, or for their classical or historical connections? Or perhaps it was the pictorial cycle of classical gods, semi-gods, and celebrated semi-nude heroes of antiquity that should be credited for keeping *Aratea* manuscripts alive through the thousand years of the medieval period?

This inquiry addresses these issues and attempts to clarify the content, function and circulation patterns of the three Latin poems. In order to understand *Aratea* manuscripts more

fully, it was necessary to pursue the sources of astronomical art and to examine the cultural and historical circumstances that influenced *Aratea* manuscript production. This dissertation has attempted to pull together the numerous threads of this complex but highly-valued body of manuscripts to provide a more complete understanding of its role, especially in the transmission of astronomical knowledge.

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I am thankful for the assistance and cooperation of the British Library and for generously removing BL Harley MS 2506 from their current exhibition in order that I might examine it. Librarians at the El Escorial and Biblioteca Nacionale in Madrid were quite kind and helpful while conducting my research there. The Hill Monastic Manuscript Library at St John's University, MN was also a helpful resource for accessing *Aratea* manuscripts. I would also like to thank Susan l'Engle at the Vatican Film Library, St Louis University for her advice and assistance. Marcia Rostek was always on hand to provide aid at the Frick Fine Art Library.

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Nunc autem iter ad astra

1.0 GENERAL INTRODUCTION, BACKGROUND, AND GOALS OF THIS DISSERTATION

The astronomical poem, the *Phaenomena,* is the first organized and detailed description of the positions, myths and diurnal motions of the numerous constellations that fill the heavens. Composed by the Greek writer Aratus about 275 BCE, it became the most famous of his many poems. The *Phaenomena* was admired in Hellenistic circles for its clever and colorful verses depicting the stars in the firmament. The popularity of this ancient poem continued into Rome's literary world as the Greek ode to the heavens was translated into Latin by many admirers, so that it could be enjoyed by educated readers in the Roman World. The Latin translations of the *Phaenomena*, commonly called *Aratea*, never lost favor in the Latin West, as they were revived by the Carolingian 'court schools', copied and enhanced with outstanding illustrations by the Carolingian scriptoria. We are fortunate that thirteen ninth-century *Aratea* manuscripts survive and that the Carolingian manuscripts were in turn copied numerous times in the following centuries. The imaginative cycle of pictures that bring the constellations to life were copied as well, imitating but seldom equaling the superb Carolingian originals. Beautifully illustrated

manuscripts of the poem survive from every century ranging from the ninth to the fifteenth.[1] In fact, Kurt Weitzmann names the *Aratea* as "the most frequently illustrated text from antiquity".[2] The celestial images inspired by Aratus' *Phaenomena* impacted astronomical art throughout the thousand years of the Middle Ages in frescoes, mosaics, sculptures, and especially, manuscripts.

Through time the Latin texts of the three principal translations of the poem were transmitted with a great number of changes, and the illustrations accompanying the poem as well, show substantial variations in the pictorial cycles that continually develop and evolve throughout the long medieval period. Classical elements, retained from illustrations in Late Antique codices, can be found in ninth-century manuscripts and also in later ones. Iconographic characteristics and attributes from Greco-Roman mythology were retained by medieval illustrators. During the twelfth and thirteenth centuries, the influx of great numbers of astronomical and astrological texts from the Arab World encouraged further fascination with the stars in the West; and the distinctive Islamic illustrations of the planets and constellations introduced more exotic influences to the images in the *Aratea* manuscripts. Rather than declining in popularity at the waning of the Middle Ages, the *Aratea* enjoyed an enormous boost during the Italian Renaissance, as the study of astronomy and astrology blossomed and fascination with the classical past expanded. Illustrations of the constellations seen in manuscripts of the fifteenth century display more colorful, costly and elaborate picture cycles appropriate to the extravagant lifestyles of the European courts. The poem's popularity continued even into the printed era,

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1 A listing of the surviving illustrated manuscripts of the Aratea can be found in Appendix A, arranged by century and by country in which it is currently held.
2 Weitzman (1959) 25

attested by the numerous incunabula and early printed copies. These books are often illustrated with woodblock prints quite similar to the pictures in illuminated manuscripts, and surviving incunabula copies can be found in most major libraries.

When viewing this long poetic tradition, it is of great interest to see that the presentation of the texts of the *Aratea* and the accompanying pictorial cycles have no standard format, except for the general order of the constellations which mostly follows the arrangement designed by Aratus/Eudoxus. In these Latin manuscripts, the poem itself is most often accompanied with commentaries and scholia. Usually the pictures are intermingled with the corresponding verses of the poem, preceding the descriptions. Most often the Aratean texts are included with astronomical treatises of other writers, such as Pliny the Elder (CE 23/4-79), Hyginus (64 BCE-CE17), Macrobius (ca.360-ca.422), Isidore (560-636), or Bede (673-735). In these astronomical compilations, a huge variance can be detected in the arrangement of the texts and also in the quality of the illustrations. Some are luxurious copies of the highest caliber, produced for the royal courts of Europe, others are modest or poorly-executed sketches for scholars, monks or students, and many variations can be found between these two extremes.

This dissertation examines the *Aratea* manuscripts in conjunction with other illustrated manuscript traditions that also conveyed astronomical information. In this way a fuller understanding of the role of the *Aratea* manuscripts in the transmission of astronomical knowledge can be determined. By looking at separate aspects of this long poetic and pictorial tradition, this study presents a general overview of the Aratean manuscripts by the compilation and cataloging of known surviving copies, and by examing the quantity, quality and variety of

manuscripts. By implication, it can also give some idea about how much does not survive. As the number of *Aratea* manuscripts is quite large, I devote individual attention to six selected manuscripts from the ninth, twelfth and fifteenth centuries, chosen for their particular qualities and their exemplary time periods. I explore the transmission of the 'scientific' information as well as the cultural aspects of the manuscript's production, relative to these three time periods. As an art historical study, attention is focused on the composition and iconography of the illustrations to determine how societal interests and stylistic changes influenced the manuscript production through time. This dissertation also establishes criteria for identifying the authors of astronomical texts and discusses the various types of astronomical pictorial cycles.[3] At this time art historians have no comprehensive resource or informational basis to consult when researching the subject or the history of astronomical illustration in general, nor of the *Aratea* manuscripts in particular. This study will assist in bringing a fuller understanding to the body of surviving manuscripts of the *Aratea* that transmitted this important collection of astronomical knowledge, written originally in Greek, translated into Latin, and conveyed during the Middle Ages through the text and images of this small-scale epic poem.

3 Appendix A lists the surviving Aratea manuscripts; Appendix B gives further descriptions of the manuscripts; Appendix C lists the forty-eight standard constellations and their description by Aratus as well as other pertinent information.

1.1 STATE OF THE QUESTION

The text of the *Phaenomena* has survived periods of great interest along with periods of neglect. A textual analysis of the original Greek poem was carried out in the 19th century, and then it was ignored until the 1990's when extensive studies were published by Douglas Kidd and Jean Martin.4 The text of the Greek poem has been thoroughly analyzed, studied and commented upon by both literary scholars and historians of astronomy, as it was based on the important astronomical work of Eudoxus (390-337 B.C.E.), a contemporary of Plato and Aristotle.[5] The Latin translations of the *Phaenomena* that have survived from ancient Rome have also been thoroughly studied by classical text scholars, in respect to both its place in Hellenistic literary culture and in Augustan poetry.[6]

The illustrated manuscripts of the *Aratea*, even though they constitute the oldest corpus of astronomical images, have not been studied as a whole tradition, nor have their role in the transmission of astronomical knowledge been examined. The monumental compilation by Saxl, Meier and McGurk of astronomical and mythological illustrated manuscripts includes many of the *Aratea*, plus a few sample miniatures of the constellations from many of their listings.[7] Their collaborative work discusses the picture cycles in general, and it gives the basic information

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4 Jean Martin, Aratos: Phénomènes, Texte, établi, traduit et commenté. 2 vol. 1998, and Douglas Kidd, Aratus Phaenomena: Introduction, Translation & Commentary, 1997.

5 Dicks 151 Eudoxus of Cnidus was a Greek astronomer, mathematician, geographer and philosopher. He wrote on astronomy, music and medicine, but none of his writings survive. His works are known from descriptions and quotations by other writers. Like Plato and Aristotle, he had a 'school' or academy in Athens.

6 The bibliography demonstrates the large number of articles written by classical and text scholars and the scarcity of art historical articles. Text scholars have no interest in the illustrations and rarely even mention them.

7 See Saxl and Meier in bibliography.

known about each manuscript. Several of the illustrated astronomical manuscripts of the *Aratea* have been given detailed attention and most are described in their library surveys. Some of the outstanding illustrations from *Aratea* manuscripts have appeared in exhibition catalogs and in library collections. A detailed discussion of the published literature concerning the illustrated *Aratea* manuscripts appears at the end of this Chapter.

Various journal articles have appeared concerning distinctive features of certain *Aratea* manuscripts; but as yet there is no comprehensive survey determining the number of illustrated manuscripts. Nor has there been any analysis of the distinctive types of illustrations and how they relate to the text, nor of the manuscript tradition as a whole. Some possible reasons for this limited attention by art historians are: first, the complicated history of the Latin text with the three different translations of the poem; secondly, the subject matter of the poem which requires a basic understanding of the complex motions of the heavens; thirdly, the surviving manuscripts are scattered throughout libraries in Europe and the United States and have not been tabulated into one comprehensive catalog.[8] And finally, there has been much mis-identification in library cataloging, since many Aratean works are listed as Aratus, which needs to be corrected. (Most don't understand the difference.) Unfortunately the study of the artwork and diagrams in medieval astronomical manuscripts has fallen between the seams of art and science and as a result, has not been fully investigated by either field. Although the textual component is a factor,

8 D.B. Gain, in "The Aratus ascribed to Germanicus Caesar" gives the stemma of Germanicus manuscripts and J. Soubiran in Cicèron: *Aratea Fragments Poètiques*, lists surviving manuscripts of Cicero, but neither are interested in the illuminations. Kidd, Martin and Mair, Aratus, *Phaenomena* translation present accounts of the Greek manuscripts and the early printed copies.

the art historical aspects of this significant literary and ‘scientific’ tradition are the central focus of this dissertation.

This dissertation addresses important questions beyond the quantity, quality and dates of the surviving illustrated manuscripts. Essential questions need to be answered. What astronomical models were available for medieval illuminators? In what particular manner are each of the three Latin authors illustrated? Are there patterns to be discerned in regard to the illustrations of each author? Do particular types of paintings accompany each different author of astronomical material? Is there an association between the text of the poem and the artistic form of its illustrations? Are the illustrators reading the poem and creating images in accordance with their reading, or mainly copying earlier exemplars? Are the *Aratea* manuscripts, as often stated, the main source of astronomical information in the Middle Ages? What were the other sources? Who were their readers? This study tabulates, examines, defines and interprets the extant *Aratea* manuscripts to help in clarifying many of these perplexing issues, both within the individual examples and as a 2000-year illustrated poetic tradition.

1.1.1 Significance of the Research

The *Aratea* manuscript tradition has had a complex history, requiring some clarification. The astronomical poem by Aratus has survived intact in its original Greek form, including the last section called the ‘Weather Signs’. But the Greek manuscript tradition includes only the text; in most cases they are not illustrated, and the *Phaenomena* circulated in the Greek-speaking areas, not in the Latin West. Therefore the Greek manuscripts of the *Phaenomena* are not a part

of this study. The authors of concern here do not include Aratus himself, but three famous Roman writers: Cicero, Germanicus Caesar and Avienus. Each of these Romans translated a personalized version of Aratus's poem from Greek into Latin and these three translations were mainly responsible for the poem's survival in the Latin West.[9] The survival of the astronomical portion of the poem from the Germanicus and Avienus versions are more or less complete, but Cicero's translation is fragmentary.[10] Therefore some medieval manuscripts contain the Latin text of Germanicus, some have the poem of Avienus, and others include the existing portions of Cicero. Thus the Latin manuscripts of the *Phaenomena* are referred to collectively as the *Aratea,* because they are versions of Aratus's poem. In addition, the texts of the three Roman authors may appear in various combinations, used to fill in missing sections and amplify others.

To further compound the situation, astronomical writings of Hyginus, Pliny the Elder, Isidore, Bede, or other early Latin authors are sometimes integrated with the *Aratea* text also. As a result, there is sometimes confusion in art historical literature as to which manuscripts include the actual poem translated from Aratus, and which texts should be credited to another writer. The problem is further confounded by the fact that at times the sources of the astronomical texts are not identified in any way, but are simply included within a miscellany of other 'scientific' writings. This dissertation will help to explain the differences among the various texts and bring a fuller understanding to this complex manuscript tradition. This study has taken an

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9 Other Romans were known to have translated the poem of Aratus into Latin as well, such as Varro and Ovid. Gee in Ovid, Aratus and Augustus: Astronomy in Ovid's *Fasti* (68-70) discusses the translation of the *Phaenomena* by Ovid, but in fact only two fragments survive.

10 Possanza 10 "With the exception of several small lacunae posited by the editors, ..Germanicus survives intact", this does not refer to the Weather Signs which do not survive and are not a concern of this study.

interdisciplinary approach by focusing on the history of astronomy as it interfaces with the history of art. The artistic focus of this study centers not only on the depictions of the constellations described in the poem, but also shows how significant 'scientific' information was encoded within some of the pictures, and how the astronomical knowledge was carried through the ancient and medieval models. Depictions of the mythological figures rewarded with a place in the heavens were not created anew in the illustrated manuscripts of the Middle Ages, these honored personages and animals of ancient Greece were modeled on the painted vases, statuary, relief sculptures, mosaics, and coins of the Greeks, and the Romans as well. This study tracks the appearance and transition of the picture cycle of the constellations that accompanies the astronomical poem; that cast of characters who traverse the dark sky, fulfilling their roles, never failing to appear in their nightly performances.

Aratus was originally commissioned to write a poem about the stars in the heavens; but what he composed was more than just a guide for learning the names and positions of the constellations. Important elements of astronomical information; the rising and setting of the constellations, the four celestial circles - the Equator, the Tropics of Cancer and Capricorn, and the Ecliptic, are also described in the poem. Learning these details would help the layperson's understanding of the structure and movements of the cosmos. All of this essential knowledge was included in the *Phaenomena* to aid those on earth orient themselves, to travel, to keep track of time, to know when to pray or when to celebrate, and to help make sense of the complicated celestial motions.

Through time, these mythological and symbolic images created from the stars, became icons packed with layers of meaning, as astronomical knowledge was assembled by the astronomers and astrologers. By far the most important of these star groups were the Signs of the Zodiac, the specific stars that circle the heavens in a band called the ecliptic, which the Sun, Moon, and planets traverse on their yearly sojourns through the sky. Subsequently the Signs of the Zodiac came to personify the calendar, seasons, time of year and even human character traits and personality types as characterized by astrology. The constellations of the Zodiac are of special consideration in this study as they, along with the Labors of the Month, are the prime iconographic symbols for the months and the seasons of the year. With the spread of Christianity, the zodiacal signs assumed additional symbolism denoting the omnipotence of God as the creator and ruler of all things in the heavens and on the Earth. Thus bundled with layers of meaning, illustrations of the Signs of the Zodiac appeared not only in astronomical manuscripts, but also in calendars, medical texts and Books of Hours, and in numerous other art forms: mosaics, frescoes, tapestries, stained glass, metalwork and sculpture.

Another theme that will be explored in this study is how the lofty subject matter of this celebrated poem seemed to resonate with the royal courts through history. The *Phaenomena* was originally commissioned by a Hellenistic monarch, and then was cleverly appropriated by the Romans during the early Empire period. Astronomical symbolism was an obvious association that appealed to the exalted ideals of Augustus and the Julio-Claudian dynasty. It is not coincidental that the courts of Carolingian rulers renewed the popularity of Aratus' poem in its Latin format, considering its conscious desire to re-establish the glory of the Roman Empire and

to associate the Carolingian emperors with the stars in the heavens, as the Roman emperors had done. The astronomy-loving Carolingians copied all three Latin versions of the poem many times and also adopted classical astronomical imagery in their decorative programs. This theme of royal attribution of astronomic motifs and iconography continues among the courts of European nobility and then explodes in the courts of Renaissance aristocrats.

The *Aratea* manuscripts are quite often decorated with amazing pictures and colorful diagrams of the heavenly spheres, and the iconography of astronomical art will be examined for detailed knowledge that may have been passed down from Hellenistic times. We can only speculate on how the poem was used and enjoyed during the Classical Period. Was it simply entertainment for educated Greeks and Romans to read or listen to the spoken word in poetic form? Was it required learning in 'schools' as part of a student's educational development? Was it memorized slowly, section by section, and then recited to impress the star formations on the minds of traveling merchants and sailors? The same questions could be asked for the medieval period. These queries cannot be answered for certain, but investigations of numerous issues can be undertaken, for instance, the quantity, quality and content of the extant manuscripts. This research aspires to cast a brighter light upon its celestial subject.

1.2 LIFE AND WORK OF ARATUS

Aratus shall always endue with the sun and the moon

"Cum sole et luna semper Aratus erit" (Ovid *Amores* 1.15.16)

Aratus (Greek Aratos) was born in Soli, a city in Cilicia ca. 315 BCE and died in Pella, the capital of the Macedonian Kingdom, in 240 BCE. Information on his life is provided by four main sources that are preserved in Aratean manuscripts.[11] His literary output included hymns, epigrams along with didactic poems. Aratus probably wrote the *Phaenomena* between 276 and 274, because the Macedonian literary circle of which Aratus was a part was broken up by the invasion of Pyrrhus at that date.[12] Aratus was not a professional astronomer himself, but consulted an astronomical compendium by Eudoxus, also called the *Phaenomena*, for assistance and accuracy in his descriptions of the stars. The Greek astronomer Eudoxus of Cnidos (ca.368-315 BCE) is thought to be the first to attempt a mathematical description of the celestial sphere and to formalize the constellations into a written format, but his writings do not survive.[13] Cicero reports that Eudoxus created a celestial globe covered with images of the constellations now lost; both his treatise and globe are known only from early references.[14] It is thought that Aratus used both Eudoxus' globe as well as his writings for guidance in the description of the constellations.[15]

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11 Kidd 3 For the text and full description of the four early biographical sources see J. Martin HT 137-95. Martin attributes the vita to Theon of Alexandria, a grammarian of the first century BCE. A biography also appears in A. W. & G. R. Mair, 185 -189.

12 Mair 189 After the invasion of Pyrrhus, Aratus went to the Court of Antiochus I, where he completed an edition of Homer's Odyssey.

13 Kidd 14 Eudoxus studied with the Pythagoreans and spent 16 months studying with Egyptian priests at Heliopolis, where he made astral observations. He also spent time in Athens and had the opportunity to discuss his writings with both Plato and Aristotle. His writings are known mainly through references by other authors.

14 Dicks 153 Cicero records the tradition that Eudoxus created a star globe and that Eudoxus' celestial globe pictured the constellations accurately. Another early celestial globe, carved in stone, is known as the Farnese Atlas, its direct descendent. The Farnese survives from the 2nd century C.E, and is discussed in detail in 2.2.1.

15 Martin XCVI

Utilizing the scientific writings and the celestial globe of Eudoxus as guides for the technical material, and looking to the writings of the two great epic poets, Homer and Hesiod, as models for his poetry, Aratus created his masterpiece. Even though Aratus was not a trained astronomer, he proved that it was not necessary to be an expert to speak intelligently and eloquently on that topic. But sometimes he does get it wrong and astronomers, such as Hipparchus (fl.150-125 BCE), were anxious to point out his errors.[16] His poem was an immediate success bringing Aratus immense prestige among Hellenistic poets, and inspiring commentaries, criticisms and exegesis. He was even quoted by St. Paul in the New Testament, Acts of the Apostles,[17] and by St. Jerome.[18] For his great poetic accomplishment, Aratus was recognized with a monument in birthplace of Soli and his image even appeared on local coins.[19] Not forgotten by modern astronomers, he was memorialized in recent history when a crater on the Moon was named in his honor.[20]

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[16] North (1194) 98 The sole surviving work of Hipparchus is *A Commentary on the Phaenomena of Aratus and Eudoxus*, in which he computes many simultaneous risings and settings of stars. It is thought that he worked mainly on the island of Rhodes. Hipparchus is the "first Greek astronomer who is known to have systematically applied arithmetical methods to geometrical astronomical models" (92). Even before Hipparchus, Attalus of Rhodes wrote a commentary on the *Phaenomena*. (98)

[17] Farber 1-3 Luke writes of St. Paul's visit to Athens in CE 51, where Paul wishes to convert, yet not to ridicule his educated audience. Paul, speaking of God, quotes from the poem of Aratus, who was speaking of Zeus. Aratus' words from the fifth line of the proem of the *Phaenomena* are recorded by Luke and attributed to Paul in the second half of Acts, 17.28, *For we are indeed his offspring...*

[18] St. Jerome comments on St Paul's reference to the poem saying "*quod hemistichium in Phaenomenis Arati legitur, quem Cicero in latinum transtulit, et Germanicus Caesar, et nuper Avianus et multi quos enumerare perlongum est*", Comment. in Epistolam ad Titum quoted by Vicor Buescu in *Cicéron: Les Aratea* (1941) p. 20 as mentioned by Dodwell, p. 61.

[19] Mair 189

[20] Retrieved from "http://en/wikipedia.org/wiki/Aratus"

1.3 THE PHAENOMENA: TEXT AND STRUCTURE OF THE POEM

The *Phaenomena* is not only a brilliant work of poetry, it is the oldest surviving systematic record of the classical constellations, including a precise verbal description of their relative positions. It is a didactic epic modeled on Hesiod's *Works and Days*, but shows influences from the current ideas and writings of the Stoic philosophers. Aratus' poem can be organized into five sections: the proem (1-18); the constellations and planets (19-461); the measurement of time (462-757); the weather signs (758-1141); and conclusion (1142-1154).[21] The poem begins with the proem honoring Zeus who is recognized as the designer of the celestial phenomena organized as signs for the benefit of humanity. Following the invocation, Aratus launches into a systematic presentation of each constellation establishing its name and relative location, after which is a very brief mention of the five planets. As the poem advances, Aratus balances the entire system by applying reference lines on the celestial sphere: the celestial equator, the ecliptic and the two tropics, and then relates them to the Milky Way. Once the basic structure of the cosmos is explained, Aratus introduces time by setting the celestial system in motion. He recounts the constellations as they rise against the eastern and set upon the western horizons, then adds the motions of the sun and moon. Finally he descends from the description of the celestial patterns to the terrestrial phenomena, the *Weather Signs*, where the wind, rain, clouds and storms are interlinked with the activities and behavior of the animals. Through the benevolence of an overseeing god, the various phenomena of nature are expressed through signs

[21] Kidd 5-7 This division refers to the original poem in Greek, not the Latin versions, but they follow the same basic outline.

made available for the benefit and betterment of humanity. In his didactic poem, Aratus dramatizes a poetic vision of a starry sky, not as meaningless points of light, but as a dynamic system, that demands our notice, involvement and interpretation. The reader is invited to interact with the narrative, and requested to 'take pains' to learn the patterns of the stars and attune ourselves with the semiotic patterns of celestial and earthly phenomena.

> and the stars which, when sighted in Poseidon's realm or
> in that of Zeus himself, give clearly defined signs to men.
> Therefore take pains to learn them [758]

The Proem

The proem is a hymn to Zeus the father-god, who designed the constellations to define the year's rhythmic cycle. The stars are not positioned merely as guides for determining time and the seasons, but also as signs of the existence and power of the almighty Zeus. But the Zeus of Aratus is not the vindictive, impersonal god of Hesiod, rather he is the origin of all forms of life, the benevolent vital force of the Stoics, permeating the complete cosmos.[22] Like a loving father, Zeus supports humans in their struggle for existence on earth, especially by providing guidance through signs in the heavens.

> Let us begin with Zeus, whom we men never leave unspoken.
> Filled with Zeus are all highways and all meeting places of people,
> filled are the seas and harbors;
> in all circumstances we are all dependent on Zeus.
> For we are also his children, and he benignly gives helpful signs to men,
> and rouses people to work, reminding them of their livelihood,

[22] Hornblower 691-2 The Stoics were a philosophical movement based on the idea of a harmonious, well-organized universe designed by a providential deity, making itself known to humanity through the signs of nature.

> tells when the soil is best for oxen and mattocks,
> and tells when the seasons are right both for planting trees
> and for sewing every kind of seed.
> For it was Zeus himself who fixed the signs in the sky,
> making them into distinct constellations,
> and organized stars for the year
> to give the most clearly defined signs of the seasonal round to men,
> so that everything may grow without fail.
> That is why men always pay homage to him first and last.
> Hail, Father, great wonder, great boon to men, yourself and the earlier race!
> And hail, Muses, all most gracious!
> In answer to my prayer to tell of the stars in so far as I may,
> guide all my singing.[23] (1-18)

Aratus begins the proem with a reverential tone, invoking and honoring Zeus which sets the theme for the following verses. He concludes the proem by invoking the Muses, respectfully requesting their guidance and inspiration in his writing or 'singing', as poetry was often chanted.

The Constellations

The countless expanse of stars and their random dispersal throughout the sky preclude any means of organizing and discussing them without systematizing the heavens in some manner. Not having the coordinates, right ascension and declination used in modern astronomical studies, the ancient cultures simply arranged the brightest stars into groups and patterns, then assigned easily-remembered pictures and stories to each recognizable star cluster. The origin of constellations reaches far back into antiquity, but those described by Aratus were formalized and personified by the ancient Sumerians and Greeks. The main body of the poem, lines 19- 461, supplies factual information, elaborating on forty-six constellations by describing their positions and appearances, so that they could be easily remembered. The poem continues

[23] Kidd 73

in an orderly fashion with a brief account of each star pattern, occasionally including the mythology surrounding the characters. Aratus' descriptive verses, and a summary of pertinent information explaining the significance of each constellation, along with sample illustrations can be found in Appendix C.

When creating his poem, Aratus did not simply turn a list of constellations into verse, but applied his particular talent and ingenuity. Through his poetic descriptions, he creates word pictures; but he never actually discusses the number or location of any individual stars within the configurations.[24] By directing the reader toward a specific place in the sky close to another constellation and by describing this group of stars, Aratus enables the reader to compose a picture inspired by the magic of his words. The mental pictures created by the words did not seem to translate into actual pictures in the Greek manuscript tradition; except for a very few exceptions, no illustrations survive in Greek copies of the *Phaenomena*. The two exceptions, both from the fifteenth century, are listed in Appendix A and discussed in Appendix B.

The Planets

In contrast to their prime importance in later astronomical and astrological texts, Aratus' poem gives scant attention to the erratic movements of the five known planets, only seven lines 454 - 461, are devoted to the wandering stars. Aratus himself tells us that he does not feel competent to discuss their ever-changing positions, he declines to even name them. The planets were not ignored due to a lack of interest, but because they are irrelevant for his purposes and

[24] Other writers enumerate the relative positions and the numbers of stars on head, feet, or tail of a figure. With the introduction of the Arabic texts and illustrations during the 12th century, the placement of the stars within the constellation becomes more precise.

provide no guidance for the telling of time.[25]

> But there are five other stars among them, but quite unlike them,
> that circulate all the way through the twelve figures of the Zodiac.
> You cannot in this case identify where these lie by looking at other stars,
> for they change their positions. The years of their orbits are long,
> and at long intervals are their configurations when they come from afar into conjunction.
> I am not at all confident in dealing with them: I hope I may be adequate
> in expounding the circle of the fixed stars and their guide-constellations in the sky (455-62)

The other two 'planets', the Sun and Moon, were of much greater interest to Aratus, since their positions and appearances are instrumental for weather prediction and for calendric purposes; therefore they are discussed in the final section of the poem, the *Weather Signs*.

The Measurement of Time

After the forty-six constellations of the celestial sphere are named and described, Aratus then proceeds to explain how to use them to measure the passage of time. The third section, lines 462 - 757, contains the more technical information of how the universe functions.[26] The poem discusses the celestial circles, and also the simultaneous risings and settings of the constellations, those star formations that accompany the zodiac called the paranatellonta and the periods of time that are indicated by these astral events.[27] Aratus explains the cycle of the moon and advises his readers to be observant. His account of the ways to estimate the passage of time by observing the positions of the sun, moon and constellations concludes the section just before the *Weather Signs*, particularly helpful for sailors or voyagers at sea who had no land to orient their position.

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[25] Kidd 343 Since the time of Eudoxus, the explanation of the erratic movements of the planets was a central concern of astronomers.

[26] Kidd 347 He achieves this through a system of four circles that mathematicians have drawn on the celestial sphere to give points of reference for determining the apparent position of the sun in reference to the fixed stars at any time of the year.

[27] Illustrations of the paranatellonta do not appear in astronomical manuscripts until the translations of the Arabic texts, mainly in the twelfth century. These will be discussed in Chapter 2.

Although we are blessed with many signs, we 'do not yet have knowledge of everything from Zeus, but much still is hidden' [769-70].

The Weather Signs

The fourth part of the poem, lines 758 - 1141, is called the *Weather Signs*, sometimes referred to as the *Diosemeia,* or *Signs from Zeus*. Here Aratus switches his focus from the signs in the heavens to the signs on earth. These verses explain the phenomena of nature and tell how storms, lightening, winds or even good weather can be predicted by observing the behavior of birds and animals in addition to the events in the heavens. The animals interact with the environment, and their actions reflect the processes of nature, but do not necessarily cause them. Their activities, along with other phenomena such as clouds or storms, are indicators or warnings to assist humanity. Even mice can be prophets. This attunement with nature makes it less risky for farmers and sailors to forecast favorable conditions. For example, the appearance of Arcturus is useful in predicting rough weather at sea.[28] Since the *Weather Signs* has firstly an earthly focus, secondly rarely appears in Latin manuscripts, and lastly was never illustrated, that last portion of the poem will not be included in this study.

The Conclusion

Aratus sums up his great work with a comforting conclusion in the final section, lines 1142 - 1154, a summary of the principal lessons. He directs his readers not to make light of the god-given signs, and to watch carefully for confirmation. If two indicators point to the same

[28] Kidd 431

situation, have hope, if three signs are seen, have confidence, the signs are provided by Zeus. His final lines give hope and reassurance to those who would follow his guidance:

> If you have watched for these signs, all together for the year,
> you will never make an uninformed judgement on the evidence of the sky. [1154]

1.3.1 The Reception and Influence of the Phaenomena in the Hellenistic World

Aratus' poem enjoyed immediate success among Greek readers not only for its concise and helpful astronomical information, but also for its literary style in a society that valued its rich poetic tradition.[29] The poem is carefully written and succeeds in its goal to educate and inspire appreciation for the beneficial signs placed in the heavens and on the earth by a thoughtful god. Aratus' talent and genius for composing verse enabled him to turn a dry prose work of technical astronomy into a sensitive and easily-memorized poem, plus his ability to create puns and literary jokes provided entertainment for his educated readers. It satisfied the need for scientific knowledge in an easy-to-digest literary form, and also presents a system of physics that explains the "unified and divinely governed cosmos".[30] Of course not everyone in the society could read; it was a limited audience who could understand the literary qualities of the poem, and an even smaller number who could appreciate the subtle references to Homer and Hesiod. But since poetry is created to be heard as well as to be read, all listeners - young or old - could enjoy

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[29] Lombardo 1 He calls it "one of the most successful poems in the classical world".

[30] Gee (90) explains how Aratus incorporates the Stoic philosophy into the poem. "Aratus as a Stoic poet, who works with the elements of language, "builds the cosmos".

recitations of the stories and myths, and could commit sections to memory.

An understanding of the heavens was essential to those living in earlier times, a necessity which modern society can never truly understand. Understanding of the rhythms and cycles of the stars and planets was crucial for functioning in a world without lights, clocks, or an accurate calendar. Knowledge of the celestial movements was indispensable for travel, to determine the time and direction, during both day and night and on land and sea. Therefore the P*haenomena* was successful not only for literary reasons, but it provided practical information in an entertaining format as well. The mythological stories of the celestial inhabitants were well known in the Hellenistic and Roman worlds, but visualizing the characters acting out their roles in a precise, predictable routine enabled the constellations to be more easily imprinted on the mind of the viewer. Year after year the sparkling star patterns that activated the fabled myths never failed to appear at their appointed times. By dividing the vast sky into compact sections, the poem organizes the stars that would otherwise be impossible to identify or retain. The association of pictures and words created by the poem helped the reader to determine the time of night, season of the year, and to locate the cardinal directions. The poem of Aratus inspired other writers to imitate his success and to comment on his creation.

Its Commentators in the Hellenistic World

The fame of the *Phaenomena* spread rapidly from Greece, extending to Alexandria and the entire Hellenistic world; and just as quickly, commentaries on the *Phaenomena* followed. Aratus attracted two types of early commentaries: the grammarians who were concerned with the literary aspects, and astronomers who were interested in the scientific topic, and a few who

addressed both issues.[31] (Twenty-seven separate commentaries were written by ancient scholars on the work.) In the middle of the second century BCE, Attalus of Rhodes produced an edition of the poem with an important commentary.[32] About the same time his contemporary, the famous Hellenistic astronomer Hipparchus, wrote his *Commentary on Eudoxus and Aratos,* which is extant.[33] His *Commentary* was addressed to a fellow astronomer, and in it he criticized and corrected errors found in the astronomical positions set forth by Eudoxus and Aratus.[34] Hipparchus was troubled by the descriptions of the rising and setting positions of the constellations given by Aratus.[35] A large group of exegetical scholia devoted to the *Phaenomena* also survives from the Hellenistic era.[36] The survival of this related material from ancient times gives a fuller picture of the impact and influence of the original writing. It provides an added benefit, as it can be useful in determining how the Hellenistic commentaries influenced the translations of the three Latin Arateans.

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[31] Kidd 18

[32] Mair 195 According to Hipparchus, Attalus wrote the most careful commentary.

[33] Mair 195 Hipparchus (c.190-129 BCE) is most noted for the discovery of the Procession of the Equinoxes. He wrote three books of commentary on the *Phaenomena* and determined that it was in concordance with Eudoxus on all points.

[34] Kidd 18-19 His detailed astronomical commentary is intact, and he chiefly addresses the astronomy in the poem; but he is also competent as a textual critic. He makes necessary corrections to improve the astronomical orientations, since the poem becomes a primary source for study of the heavens. For a full discussion of Hellenistic commentaries and scholia see Kidd 44-48.

[35] It has recently been established that the star charts used by Aratus actually date to around 2800 BCE. Hipparchus' investigation into the astronomical inaccuracies of Aratus, may have lead to his most famous contribution to science, the 'discovery' of the Procession of the Equinoxes. This information is discussed in more detail in Appendix C.

[36] Mair 191 The Scholia are based on the commentary of Theon.

1.4 THREE LATIN ARATEANS: CICERO, GERMANICUS AND AVIENUS

Aratus became popular in Rome in the first century BCE when his work was translated into Latin by Cicero and Varro Atacinus, and was imitated by Virgil and other Roman poets.[37] In the early years of the first century CE, Germanicus Caesar added his imperial influence to the poem's reputation and dissemination with his rendition. In the fourth century, a translation by Avienus demonstrates that its popularity had not waned. Each of the three principal translators of the *Phaenomena* contributed his own expertise and individual style to his version of the poem. Each author brings to the work his own distinct qualities, his poetic talent, plus his reading and interpretation of the source material. Although each version was written independently and in different historic eras, each was influenced by the poem's reputation, as well as the large compendium of criticisms, commentaries, and scholia that accompanied the original poem from readers in both the Hellenistic and Roman worlds. Translating the *Phaenomena* would have presented a challenging ordeal for a Latin poet for many reason: because of its 'canonical status' and 'refined style', because it was a technical guide to the stars, and most significantly because it was, and still is, a 'sophisticated literary work' on religious and philosophical matters.[38] The poem of each of the three Latin Arateans will be discussed in more depth in later Chapters.

Marcus Tullius Cicero (106 - 43 BCE)

Cicero was the earliest and most renowned Roman to Latinize the poem, translating the

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[37] Kidd 46

[38] Possanza 98

Phaenomena from Greek into Latin in the early 80's BCE, while still a young man.[39] He was a distinguished statesman, persuasive orator, skillful lawyer and articulate writer, and a dominant member of Roman society, a controversial voice in the politics of his time. Many of his speeches and private letters are extant, but little of his poetic efforts. Of his surviving poetry, his Latin version of the *Phaenomena* is the most respected work. Cicero had a limited proficiency in poetry, and in spite of his reputation as an excellent speech writer, was not considered a good poet by his contemporaries. But he created his translation when still a young man.

Cicero's translation of the poem exists only in fragments totaling 469 lines out of the original 1154 (including the *Weather Signs*). Almost nothing of Cicero's proem is known, and so unfortunately it cannot be compared with either the original or the other copies. Before line 230, survival of his version is very fragmented, with only sixty-three extant lines; a large section from line 230 to 400 exists complete. The poem then breaks off, and various portions of the remaining verses survive; of the later descriptions, between lines 479 and 700, we have only one line. There is little extant of the last part of the poem, the *Weather Signs and Prognostications*, just a mere twenty-seven lines.[40] Cicero's translation is close to the Greek; but he adds brief descriptions, especially of the animal forms depicted in the sky. Like the original, his version has a long section that describes the constellations, the circles that define the path of the sun, and the rising and setting of the constellations. Cicero includes descriptions of the mythological stories

[39] Buescu 29

[40] Perhaps the *Prognostications* were removed during the Middle Ages by a zealous monk, as predictions and omens were considered suspect by the Church.

associated with the various constellations, expanding the lore of the original poem.[41] A full listing and description of extant Cicero's *Aratea* manuscripts is included in Appendices A and B.

To improve on the rather technical and mechanical format of Aratus, Cicero's translation of the *Phaenomena* is more dramatic than the rather bland original, displaying 'stylistic dissonance' and a 'fondness for the epico-tragic diction of early Latin poetry'.[42] Writing before the development of the radical changes brought in by sophisticated Augustan poetics, Cicero's poetry is wordier and less compact when describing the fables associated with the constellations. His version is often more detailed and more vivid. Living in an earlier society, he did not have the benefits that Germanicus had available in Augustan poetic circles, the ability to study and draw inspiration from the highly-polished works of contemporary authors.

Cicero concentrates more on the didactic aspect of the work which he wishes to enhance, he makes frequent reference to the Latin equivalents of the Greek names of the constellations. He repeatedly uses 'formulaic phrases' when describing a constellation, discussing its brightness, its position, and its motion through the sky. As stated by Possanza in his discussion of Cicero's description of the zodiac, "...in order to construct a numerical correspondence between the description itself and what is being described: there is one verse for each of the twelve zodiacal constellations, in seven of those verses the name of the constellation occupies the last position in the line, a structural device which may have aided in the memorization of the sequence".[43]

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[41] Gee 87

[42] Possanza 10

[43] Possanza 177 He also explains a poem on the Zodiac by Cicero's brother Quintus.

Cicero's purpose is more directed and didactic, sometimes following Aratus line for line. The intention of this poet-translator seems directed to a less spiritual or philosophical end than the original. Overall Cicero's version of the *Phaenomena* has received less attention from literary scholars than Germanicus, and is less admired as a work of epic poetry. The number of extant manuscripts of Cicero's *Aratea* is greatly exceeded by those of Germanicus' *Aratea*. But in spite of its poetic limitations and fragmented condition, this study of the body of Aratean manuscripts will demonstrate that Cicero's translation was quite popular throughout the Middle Ages, widely copied and attractively illustrated.

Germanicus Caesar (24 May, 15 or 16 BCE- CE19)

The translation of the *Phaenomena* by Germanicus has received the most attention and has been the subject of an enormous number of literary articles. Germanicus Julius Caesar was the son of Nero Claudius Drusus and Antonia, the younger daughter of Marc Antony and Octavia. After the death of his father in CE 4, Germanicus was adopted that same year by his uncle Tiberius, who himself had been adopted by his step-father the Emperor Augustus[44]. Therefore Germanicus was a member of the semi-divine Julian dynasty in direct line for succession as emperor. The young prince was an excellent soldier and inspired leader, loved by the legions and popular with the people as well. He was emotional and affable in contrast to the unpopular Tiberius; but because of his untimely death, Germanicus never came into power.[45]

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[44] Augustus's two grandsons who were in line for succession to the monarchy, both died young, requiring him to adopt Tiberius to assure his family would continue to rule. Augustus adopted Tiberius in 4 CE and demanded that Tiberius adopt Germanicus at the same time.

[45] Gleadow 65 He quotes Suetonius, who wrote of Tiberius; "He was rather neglectful of the gods and religions, being addicted to astrology, and fully persuaded that all things are brought about by fate. Yet he was

On 10 October, CE 19 while in the East on military campaign, Germanicus became mysteriously ill and died near Antioch. Was he a victim of poison? He was only thirty five when he died, but had already fathered nine children with his wife Agrippina the Elder.[46] Germanicus was honored with coins struck in his memory by Caligula and Claudius, who admired and respected him.

Some controversy and confusion exists as to whether Germanicus was the actual author /translator of the *Phaenomena*, as scholars have suggested that the author may have been Tiberius, since a case could be argued for each.[47] Reasons for suspecting that Tiberius may be the author are that early sources claim that Tiberius was addicted to astrology, and like his adopted son, had a special interest in astronomy and mythology.[48] Tiberius was also devoted to literary studies and was fluent in Greek.[49] Most experts say that there is not enough evidence to make a certain indentification of the author.[50] For this study, I will assume that the author is Germanicus, son of Drusus, adopted son of Tiberius.[51]

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immoderately afraid of thunder, and if the sky became threatening, he never failed to put on a laurel wreath, because of the common saying that that kind of leaf is never touched by lightening". Suetonius Tib. Ixix, Cp. F. H. Cramer, Astrology in Roman Law and Politics (*Amer. Philos. Soc*., 1954)

[46] Agrippina was the daughter of Marcus Agrippa and Julia, the daughter of Augustus. Nearly all Rome, and especially Agrippina blamed Tiberius for the death of her esteemed husband. She was eventually banished from Rome and is said to have starved to death in exile. Their son Gaius, nicknamed Caligula, was proclaimed emperor on 16 March 37, and Germanicus' brother Claudius became emperor in CE 41, after the assassination of Caligula.

[47] Gain 1.7 Gain gives a thorough account of the arguments for Tiberius and for Germanicus as possible authors using contemporary attributions which are vague and could apply to either. His final opinion is that the evidence does not allow one to know conclusively which of the two is the actual author .

[48] Gain attributes this to Suetonius 69.1

[49] Zanker 227 He states that while in voluntary exile on Rhodes, Tiberius lived as a Greek and gathered around him a circle of poets and philosophers.

[50] Gain 18

[51] Possanza 15 In this decision, I follow the respected opinion of Professor Possanza whose authoritative study, *Translating the Heavens: Aratus, Germanicus, and the Poetics of Latin Translation*, postulates this acceptance of Germanicus as the author rather than Tiberius. See his Appendix A, Authorship and Date, 219-43

Well-educated in the classics, Germanicus belonged to the Roman literary culture and was known to have a strong interest in both astronomy and astrology. He was eloquent and studious, writing comedies in Greek (all lost) as well as Latin epigrams. Evidence shows that, like Cicero, he translated the *Phaenomena* as a young man, between CE 4 and 7.[52] During this time he would have been between eighteen and twenty-one years old, at the end of his career as student, but before he would have taken on the obligations of a political and military career required for a prominent member of the ruling family.

Germanicus' translation is derived from Aratus, but is far from an exact copy. His version, composed almost 300 years later, is shaped by a different vision of the heavens and is directed to a very different audience, inhabiting a vastly different society. He transforms the Hellenistic text of Aratus into a Latin poem, the epitome of Augustan literary society. Like Aratus, he looked back to the epics of Homer and Hesiod for inspiration, but in addition he was able to draw from the Hellenistic poets, Callimachus and Nicander, and even Virgil and Ovid.[53] He worked from the Greek poem, but reinterprets it and then supplements it with current works by contemporary Roman writers. He responds to Cicero's version, but avoids his formulaic and repetitious style. Germanicus makes subtle but perceptible changes in order to create a poem, quite similar in its subject matter, but completely different in intention from the original. His

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[52] Gee 69 She shows evidence that Ovid also translated the *Phaenomena* at an early age, "as it was a good way to cut one's poetic teeth". It would be an excellent exercise as students could learn to translate Greek into Latin, learn versification, mythology and astronomy at the same time, only two brief fragments of Ovid's version remain. Varro of Atax also translated the poem into Latin. Germanicus' poem was influential in Ovid's other writings, as Gee links his *Fasti* with Aratus' astronomy

[53] Possanza 2-5 Here he presents specific examples of how Germanicus cleverly incorporates the vocabulary and phrases of the other poets, honoring both their work and his erudition.

proem imitates the 'solemn and elevated tone' of Aratus; and his construction, supplication, and content are similar. But his purpose is not to promote Stoicism, nor to honor the god Zeus who, Aratus says, placed the stars in particular patterns as signs and guides to assist those on Earth. His purpose is instead to honor Augustus for establishing his reign of peace throughout the Roman Empire.[54]

The astronomical section of Germanicus' hexameter poem survives complete except for several small lacunae listed by the editors, the *Weather Signs* are not extant.[55] When comparing the structure of the *Aratea* with Aratus' poem, the similarities are obvious. Looking to the original line by line, the *Aratea* is intact to line 725, which is comparable to Aratus' line 732, but with 'many omissions, expansions, contractions or additions'.[56] Basically the structure of the two poems is quite similar, but there are great differences in their content. In addition to the mythical material, a major inclusion in Germanicus is his addition of information on the five planets, which Aratus in general had elected to ignore. The inclusion of the planetary material is important for the pictorial program, as it invites illustrations of the five planets. After his lengthy descriptions of the stellar constellations, comes the *Prognostications*, but only fragments survive from this last part of the poem.[57] The concluding section of both poems has the same theme, the influence of the phenomena of the heavens on atmospheric conditions. But again, Germanicus'

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[54] Possanza 107-8

[55] Possanza 8 - 10

[56] Gain 13 His proem is sixteen lines compared to the eighteen lines of Aratus' proem. Germanicus describes the constellations on lines 24- 433 compared to Aratus, lines 26- 450; his Risings and Settings appear on lines 573-725 compared to Aratus' 559-732.

[57] This final section is not based on Aratus' *Weather Signs*, but on astrometeorology; since it is fragmentary, its source and totality cannot be known.

intention is quite different, in his version the stars and planets are not just predictors of the weather; but instead are the active causal agent. This idea differs greatly from Aratus' *Weather Signs* which point to interaction with animals in a semiotic manner to help humanity. Over all a grand total of 948 lines survive in various Germanicus manuscripts - many more than Cicero's 469 lines, but less than Avienus' 1878 lines, by far the lengthiest version.

For the most part Germanicus mirrors Aratus' poetic construction, format and content; but he eliminates some segments, elaborates others, and often corrects observational errors that had been pointed out by the commentators, such as Hippocrates. He usually paraphrases, rarely conforming to Aratus word for word.[58] Where his translation differs significantly is in his treatment of the principal subject matter, the constellations. Germanicus concentrates his attention on the figures formed by the stars, showing greater interest in the myths, whereas Aratus was more interested in the relationship of the star patterns to one another. While Aratus includes forty-six constellations, he is highly selective in his discourse on the fables attached to them, giving a catasterism myth for only fourteen. He is more concerned with their relative placements than with the legends attached to them. In contrast, Germanicus is all-embracing in his recounting of the sources that tell the archetypal stories of the humans, animals or objects that have been commemorated in the sky. Germanicus provides brief allusions to the myths of the zodiacal constellations at lines 531-564, including the lengthy tale of Virgo. Otherwise he furnishes an abundance of mythic references which Aratus chose to avoid. "Germanicus doubles

[58] Gain 13 The text of Germanicus is the focus of a study by Gain in which he traces the source manuscripts and the relationship of their copies. He points out the errors and inconsistencies of the various editions. Gain also includes a full English translation of Germanicus' poem.

the number of star myths, and develops the erotic element in those myths, even when it creates serious embarrassment for Aratus's providential Zeus."[59]

According to Possanza, "The *Aratea* has more in common with the erotic treatment of the stars found in elegiac poetry of Callimachus, Catullus, and Ovid than it does with Aratus' religious and philosophical meditation on the constellations as proof of the existence of the divine order of the universe".[60] Animated by his poetic ability, the myths are reborn, and these colorful descriptions in turn inspired the development of a pictorial cycle to embellish the stories with astronomical art. At what point Germanicus' poem first acquired illustrations is impossible to determine, but the earliest manuscripts that survive from the ninth century retain classical elements and iconography that can be traced to Hellenistic and Roman art. So perhaps their Late Antique exemplars were illustrated as well. This issue will be investigated in more detail in Chapter 4. The illuminated manuscripts of Germanicus' poem seem to have been far more popular than Cicero and Avienus, whose versions survive in fewer manuscripts. A listing of each author is included in Appendix A.

Rufus Festus Avienus (Fourth Century CE)

The third surviving Latin translation of the *Phaenomena* was composed by Avienus, a Roman aristocrat and successful poet, who lived in the second half of the fourth century. Few facts are known for certain concerning his life; he was a native of Volsinii in Etruria and was well educated. He was appointed proconsul of Africa and was living there in CE 366, (if that is

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[59] Gee 208

[60] Possanza 169

our Avienus). Like Cicero, Ovid and Germanicus, he too translated the *Phaenomena* while still a young man.[61] Though living in the Early Christian era, he was a staunch supporter of pagan religious customs; no hint of Christianity appears in his work. Avienus not only translated but greatly enhanced Aratus' poem; his version contains a whopping 1878 lines, 700 more than the original. His poem is more verbose, sometimes paraphrasing; but generally augmenting Aratus' renditions of the myths. Evidence indicates that Avienus may have used Germanicus' poem as his model.[62]

Avienus' adaptation was not as popular as a primary source of the *Phaenomena* during the Middle Ages since the other two authors survive much more abundantly. I would attribute this limited interest in his version to several reasons. Foremost, he is among most illustrious company, as his predecessors were quite prominent in Roman society; and a copy of either of their poems would be more desirable for an educated or royal patron. A second reason would be his elaborations, which included many more unnecessary details. For example, the story of the constellation of Virgo/Dike and how she became a star consists of forty lines in Germanicus; but in Avienus' retelling, he expands the account for eighty lines, twice as long.[63]

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[61] Avienus also wrote *Descriptio Orbis Terrarum* and compiled descriptions of the coasts of the Mediterranean, the Caspian and the Black Seas, but only fragments survive.

[62] One point of evidence supporting this theory, is that when naming the Pleiades, all sources list the names of the stars in different orders. But Avienus lists the names very near to the order of Germanicus, suggesting imitation.

[63] Possanza 128-145 He presents a thorough analysis of Germanicus' treatment of the catasterism myth of Virgo-Iustitia including the influence of Vergil. In the most popular version of this classical story, the goddess Dike inhabits the earth with mortal beings until the golden and silver races give way to the bronze race, she dislikes this race, and so she swiftly 'flew away over the mountains, leaving the people thunderstuck' to take her place in the heavens, becoming the beautiful constellation of Virgo.

Aratus himself gives his longest narrative to this particular myth.[64] In a recent study, Bellandi, Berti and Ciappi examine how Germanicus and Avienus interpret the different versions of this story.[65]

Avienus' version of the poem would have been useful to expand sections of the other authors, or to flesh out skimpy passages, for example, some of Avienus' verses appear in the Leiden *Aratea*, where lines of Germanicus were missing. But Avienus' poem was probably too lengthy to be copied by those interested in having a Latin copy of the *Phaenomena.* Ultimately the translations of either Germanicus or Cicero were a more practical choice when considering the expense of parchment, the space required for the inclusion of illuminations and the tremendous cost of manuscript production in general. Therefore reception of Avienus' version was not as celebrated, survival of his manuscripts is not as extensive, and commentaries on his work are fewer, making him the least successful of the three Latin poets.

1.4.1 The Reception and Influence of the *Phaenomena* in the Roman World

The *Phaenomena's* reception in the Roman literary world was a reflection of its popularity among Greek intellectuals, as the Latin world admired and appropriated the art, architecture and intellectual accomplishments of Greek society. Greek mythology was adopted,

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[64] Virgo is discussed in more detail in Appendix C.

[65] In a Bryn Mawr review of this study by Katharine Volk, she explains Bellandi's discussion of Germanicus and Berti and Ciappi's study of Avienus. Their work focuses strictly on this one small aspect of the poem. Her main criticism is that they each write on their chosen author separately and do not actually compare the two author's approaches. It remains for the readers to interpret their discussions for themselves.

Hellenistic literature was imitated, classical artworks, especially scupltures, were copied by the Romans, and the 'philosophical way of life' was the idealized lifestyle.[66] Aratus had attracted much attention among Roman authors as witnessed by his influence on Lucretius and Virgil.[67] The poem's success in Rome was further assured by the reputation and exceptional abilities of the Latin translators, Cicero and Germanicus Caesar, both highly-respected in Roman society.[68] For a general understanding of the cultural and artistic developments taking place at the time the *Phaenomena* was translated by Germanicus, Paul Zanker's informative study, *The Power of Images in the Age of Augustus*, provides essential data; also he discusses the changes in Roman society as a result of Augustus' policy of peace and prosperity. Zanker examines the 'complex interrelationship of the establishment of monarchy, the transformation of society, and the creation of a whole new method of visual communication'.[69]

Of particular importance for a deeper understanding of the reception and influence of the Latin versions of the *Phaenomena* and its place in Roman poetic circles are two recent books: a study by Emma Gee, *Ovid, Aratus and Augustus: Astronomy in Ovid's Fasti* and an authoritative investigation of Germanicus' translation recently published by Mark Possanza, *Translating the Heavens*. Gee presents specific examples that detail how the *Phaenomena* of Aratus influenced

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[66] Zanker 337

[67] Mair 197

[68] A full listing of books and journal articles documenting the poem's reception and influence can be found in the bibliography

[69] Zanker 3

the poetry of Ovid (43 BCE - CE 17) in both his *Fasti*[70] and *Metamorphoses*.[71] In addition Possanza evaluates the complexity and sophistication of the *Aratea* by Germanicus and the influences from contemporary and historic writers imbedded in his poem. Both studies furnish vital background material for this area and their analyses enable researchers to obtain a clearer picture of the Roman literary society in which Germanicus lived and wrote. Since the topic of astronomy is the central focus of this study, it is helpful to determine its place in Roman culture.

Astronomy and Augustus

During the reign of Augustus, interest in public divination and sacrifices, a characteristic of the Republic, declined and interest in the stars and astrology increased dramatically.[72] A prime example of this interest in the heavens is Augustus' commissioning of the gigantic Horologium with its astronomical orientations, its enormous sundial (the largest one ever built)[73]

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[70] The *Fasti* is examined more closely in the next section. His *Metamorphoses* is an epic poem in fifteen books, his only surviving poetry in hexameters, composed in the years immediately preceding his exile. It is a collection of imaginative tales from Greek and Near Eastern myths and legends, each alluding to a supernatural shape-shifting, changes of form - from animals to humans, animate to inanimate.

[71] Gee 4-7 She states that Ovid is indebted to Aratus and the unified cosmos he presents. "The unified cosmos of Aratus' Stoic poem is fragmented across Ovid's Roman calendar, and at the same time tied in with the shifting universe of the *Metamorphoses*. To my mind, Ovid's fragmentation of a poetic text which, as we shall see, carried political importance in Rome, and assimilation of it to a more anarchic world, runs counter to the Julian and Augustan impulse towards unity, particularly as manifest in the calendar reform of 46 BCE." She also affirms along with F. Bömer that the three works of Ovid: the *Fasti*, *the Metamorphoses*, and the Germanicus' *Aratea*, were written around the same time, and all deal with the causes of time, of natural phenomena, and of the stars.

[72] Green 146 "The Julian family, in particular, manipulated astronomical and astrological readings as a means of legitimizing their own power and curbing that of others; such activitiy was particularly fervent in the latter years of Augustust and the early years of Tiberius."

[73] Zanker 144 Included in the complex along with the enormous mausoleum (260' x 120' tall) were: 1. the obelisk (90 feet tall), 2. the horologium, decorated with monumental bronze letters, and 3. the renowned Ara Pacis. The network of markers in the complex was inscribed in both Greek and Latin noting the time of day and the time of year. Following the ancient tradition of incorporating the motions of the heavens into sacred architecture, a shadow was projected by the obelisk into the doorway of the Ara Pacis every year on the anniversary of Augustus' birth, September 22-23, the autumn equinox.

and his implementation of his moon sign Capricorn on coins, rings, glass beads and cameos.[74]

Perhaps the occupation and close contacts with Egypt during this time created an interest on the part of Roman rulers in adopting the ancient Egyptian belief that at his death, the divine pharoah sailed in his solar boat to the heavens, becoming a star in the afterlife (catasterism or astral apotheosis). To reinforce this newly-adopted belief, a fortuitous event provided a source of propaganda that advanced Caesar's catasterism; this was the amazing appearance of a comet in the skies over Rome in 44 BCE coinciding with his funeral games, the Games of Venus Genetrix that Caesar had initiated the year before in honor of his divine ancestor. Augustus later recorded in his autobiography that this auspicious comet had been visible all over the world for seven days and its appearance had been construed as a sign of Caesar's apotheosis.[75] On this occasion, according to an account by Pliny (NH 2.94), the comet appeared in the northern reaches of the sky, an area that had already been associated with Caesar's ancestors, the Julian dynasty.[76] Therefore Caesar's comet was further verification of his divine status and apotheosis; the comet's sudden appearance in the sky, while his funeral games were underway, was a powerful

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[74] Gleadow 64The date of Augustus' birth was most probably September 22, 64 BCE. The Sun had just moved into Libra, Moon was in Capricorn strengthened by an opposition to Jupiter and making a favorable aspect to Mercury, both in their exaltation. The sign of the Moon was more important at that time than the sign of the Sun. Gleadow says that his dawn birth added the impact of a Capricorn ascendant. This is impossible for if Augustus was born at dawn, his ascendant would also be Libra. Jupiter and Saturn were at the mid-heaven another favorable aspect.

[75] Zanker 35 By promoting the deification of Caesar, Augustus as his son could promote his own power and glorification by referring to himself as *divi filius.* Tracing one's ancestry back to the Greek gods or heroes, was a sacred tradition with the Roman aristocracy. Since Julius Caesar considered himself descended from Venus and Aeneas, therefore Augustus, and Germanicus as well, could claim the same divine heritage and protection. Vergil had written the *Aeneid* at Augustus' request, which closely connected the myth of Venus and the Fall of Troy with the founding of Rome, creating a preordained triumph that glorifies the role of the Julian dynasty.

[76] Gee 157- 192 She presents an in-depth analysis of this concept.

signal proclaiming to Roman society that he had assumed his rightful position among the exalted figures who had already ascended to the heavens, the gods and heros of mythology.

Subsequently Augustus placed a star on the head of the statue of Caesar in the forum; and soon the *sidus Iulium* appeared on many other statues and was engraved repeatedly on Roman coins. Caesar himself had already shown interest in the heavens by issuing coins imprinted with the star of Venus. Germanicus does not refer to Julius Caesar directly in his poem, but lines 558-60 refer to the death and deification of Augustus.

> Hic, Auguste, tuum genitali corpore numen
> attonitas inter gentis patriamque pautentem
> in caelum tulit et maternis reddidit astris.[77]

Modeling Caesar's example, Augustus associated himself with Venus and the stars in a similar way. Because of his auspicious horoscope, Augustus believed his role as "savior of the state" was "in his stars".[78] Germanicus continues these celestial allusions in his poem, when he refers to the occasion of Capricorn taking Augustus to heaven.[79]

Ovid's *Fasti* and Germanicus

More evidence for evaluating the prestige and influence of Germanicus and his translation of the *Phaenomena* appears in the poetic calendar, the *Fasti*, composed by the illustrious Roman poet, Ovid (43BCE - CE17). In keeping with the contemporary interest in

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[77] 'Augustus, you were carried into the sky on the body of this sign, under which you were born, and returned to your mother stars.' (Gain's translation -68) In general, the astrological interpretation of a comet varied depending on the region of the sky in which it was observed, more often its appearance was thought to portend negative consequences, frequently predicting the death of a ruler

[78] Zanker 48 Starting in 30 BCE, Augustus' birthday was celebrated officially as a day of good omens.

[79] Gee 157 She cites Tamsyn Barton for providing this connection.

astronomy, time and the calendar, stimulated in part by Julius Caesar's endeavor to reform the calendar which was completed by Augustus, and the installation of official calendars in public places, Ovid created the *Fasti* and dedicated it to Germanicus.[80] The *Fasti* ranks close to the *Metamorphoses*, the most celebrated and influential of Ovid's works; and it was composed about the same time as Germanicus' poem, probably begun after the completion of the *Metamorphoses*, mainly finished by CE 8, or perhaps he worked on the two projects simultaneously. With his *Fasti*, Ovid produced a calendar in verse devoted to the Roman year composed in chronological order with one book dedicated to each month; particular days of the month are noted by including pertinent historical, religious and astronomical material. The poem considers the official Roman holidays, games, and sacrifices; the rising and setting of the stars; mythical stories explaining the origin of the constellations; and it celebrates the Julian monarchy as well. Ovid describes the mythology, festivals and commemorative events of Rome; and then synchronizes them with the phenomena of the cosmos.

Ovid wrote the *Fasti* at the height of his successful career, the first six books were in a 'reasonably finished form' at the time Augustus exiled him to Tomis, CE 8, when he was about fifty years old.[81] There he made revisions in the *Fasti* that concern Germanicus. Originally Ovid had dedicated his poem to Augustus; but after the emperor's death in AD 14, Ovid revised his

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[80] In 46 BCE Julius Caesar introduced his new calendar, developed by the astronomer, Sosigenes, whose framework continued in use through the Middle Ages. One of its main accomplishments was to separate the solar year from any connection to the lunar year.

[81] Green 17 Steven Green has published a recent commentary on Book I of the *Fasti*, which includes many references to Germanicus. Some historians suggest that the final six books of the *Fasti* were in some fragmentary form, but were either lost or destroyed; others insist they were never written, for not a trace survives.

poem to honor the popular leader, Germanicus, overlooking the unpopular Tiberius, the newly-reigning emperor.[82] The following quote is the proem in which Ovid invokes Germanicus, just as Germanicus had invoked his 'father' to accept his work, the *Phaenomena*.

> The seasons distributed throughout the Latin year, their causes,
> and the constellations which set beneath the earth and rise,
> I shall celebrate. Caesar Germanicus, welcome this work
> with a tranquil countenance and guide the voyage of my timorous craft.
> Do not turn from a trifling honor but come, lend a god-like presence
> to this service here offered you. You will recognize the sacred rites
> extracted from ancient chronicles, and by what distinction each day is known.
> There too, you will discover the festivals of your own family;
> often must your father and your grandfather be read about;
> the honors which they bear and which decorate the red-lettered calendar,
> you too shall carry off with your brother Drusus.....
> ..... And we know too, when inspiration has moved you to poetry,
> how powerfully the stream of your genius flows. If it is permissible by law
> human and divine, guide as a poet the reins of a poet, so that under your
> auspices the whole year may proceed with favor.[83]

The first part of the proem is addressed to Germanicus as a distinguished member of the dynasty of Caesar and the second part to his 'genius' as orator and poet.[84] The astral material of the *Fasti* may have been partly motivated by the literary interests of Germanicus, but the astronomy in the *Fasti* is definitely not based on Aratus or Germanicus, in fact it is 'wildly inaccurate'.[85] No actual mention of the *Phaenomena* can be found in the *Fasti*; however, Ovid

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[82] Fantham 3 Most probably, he replaced Augustus to garner favor from Germanicus whom all expected to be the next emperor, succeeding Tiberius, and who might possibly allow him to return to Rome. He extended the revision to other sections, especially in Book 1, in order to integrate his new dedicatee significantly into the poem, referring to him as a poet in various places, and calling him the 'learned prince'.

[83] Herbert-Brown 174

[84] Herbert-Brown 177 Both Herbert-Brown and Gee question whether Germanicus' talent as a poet was significant enough to warrant such a compliment from the 'urbane, sophisticated' Ovid, since the *Phaenomena* is the only extant evidence of his poetic abilities

[85] Fantham 36

certainly knew the work of Aratus and even translated the Greek poem himself, for fragments of it survive, but he does not refer to it directly.[86] But in Ovid's rendition of the catasterism myths, the presence of Aratus can be felt.[87]

Many writers thought the calendar a theme worthy of poetry, illustration, and scholarly investigation of its origins. Not only Ovid, but other Roman authors, (such as Varro, Filocalus, and later Macrobius), historians, grammarians, and specialists studied and wrote about the Roman calendar and the religious festivals it celebrates. A surviving example of an illustrated calendar, the famous *Calendar of 354* by Filocalus, will be discussed in 2.1.1. The *Fasti* remained quite popular beyond the Roman period and, like the *Phaenomena*, provided a means for the transmittal of astronomical concepts.[88] Ovid's poem was appreciated and enjoyed through the Middle Ages, as more than 170 manuscripts of the the *Fasti* survive, but none of these are illustrated .[89] Was it ever illustrated? Otto Pächt remarks that it is incomprehensible that Ovid's works were not amplified with illustrations, but not a trace of a picture was ever discovered.[90]

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[86] Green 145- 48 He discusses the possible influence of Aratus and states that Ovid was probably aware of Germanicus' astronomical interests though not of his translation of the *Phaenomena*, and that 'any allusion between the two is probably (happily) coincidental'.

[87] Possanza 3

[88] The *Fasti* has been studied by historians and literary experts as a source of specific information on Roman ceremonies and ritual practices, and it is attracting new attention both as a complex work of elegiac poetry and a record of religious beliefs during the Augustan Age. Green states that the Fasti has undergone a revolution in the past twenty-five years and scholars "have uncovered a work which is both rich in literary heritage and a powerful witness and critic of late-Augustan and early-Tiberian imperial Rome". (ix)

[89] Fantham 50 Among the most important copies are: Vat. Reg. 1709 - 10th century; Vat. Lat. 3262 - 11th century; Brussels, BR.5369 - 11th century; and Oxford Bodl. Auct. F.4.25 - 15th century. The Vatican has two copies which I examined on microfilm, and neither was illustrated.

[90] Pächt 33 He writes that in antiquity, only certain works were illustrated and in addition, that the Middle Ages had a passive attitude toward the illustrations of classical texts right up to the Gothic period. Illustrations were readily copied when available, but if there were no pictures in the earlier model, none were provided.

Its Commentators in the Roman World

Commentaries on the astronomy and poetry of the *Phaenomena* were plentiful in the Roman world, just as they had been in the Hellenistic world; authors of twenty-seven ancient commentaries are known, and in fact they continue to the present day. The number of books and journal articles generated by the ancient poem of Aratus and the works of his translators increases rather than lessens with time. When you compare the thick editions of scholia and commentaries compiled by Kidd, Possanza, Maass, Martin and others with the slim volume of the 1154-line poem, it is possible to appreciate the enormous output of scholarship; and the printed exegesis inspired by the original and its three major translations.

The *Phaenomena* was admired and commented upon in the Roman World, not only for its ability to capture astronomical and mythological details in a uncomplicated format, but also for the poetic artistry of the original and the translators. This work is a unique combination of natural 'science' incorporated into a rhythmic textual format. When speaking of the poem's popularity, one needs to differentiate between its more mundane function as a utilitarian book of astronomy, memorized for its helpfulness, and its qualities as a work of verbal artistry fully appreciated only by those with the education and sophistication to understand its illusions to the classical predecessors.[91]

[91] Possanza 87

1.5 TEXT HISTORY

Relevant to its appreciation among Aratus's contemporaries, Kidd accepts that there were several copies of the *Phaenomena* in Alexandria with at least one copy held in the great Library. Hipparchus' corrections and criticisms were available in the second century BCE. Text editions of the *Phaenomena* date from the late first century BCE, at which time the grammarian Theon of Alexandria is credited with writing an edition that became the standard in late antiquity and the foundation for medieval manuscript traditions.[92]

As enumerated by Kidd, there are fifty surviving copies of the Greek poem held in various libraries.[93] Eight papyri dating from the second century BCE to the fourth century CE and fourteen early manuscripts are the basis for his 1997 edition. Text scholars, Ernst Maass and Jean Martin, each published large volumes that contributed to the accurate reading and understanding of the poem and its scholia. Every word of the poem has been analyzed by scholars for deeper meaning, references and nuances. The earliest surviving illuminated Latin manuscripts date to the ninth century, and these will be examined in Chapter 4. There are fifteenth-century editions of Germanicus, and Hugo Grotius, the Dutch humanist, printed most of what survives of the poem in his *Syntagma Arateorum* in 1600, in this edition he adapted the illustrations from the ninth-century Leiden *Aratea*. It was even translated into Arabic, as a translation was commissioned in the ninth century by Caliph Al-Ma'mun. As evidence that it is

[92] Kidd 49

[93] Kidd 57 - 68

still read and appreciated today, a modern translation and interpretation of Aratus's *Phaenomena* was published in the 1990's by Stanley Lombardo.[94] In addition to the three Latin translations, another version of Aratus' work circulated during the Middle Ages called the *Aratus Latinus*.

Aratus Latinus

The *Aratus Latinus* is a later version of the Greek *Phaenomena*, probably translated in the first half of the eighth century by an anonymous author in France, most likely at Corbie.[95] It includes a commentary on the poem and associated texts. Maass (Comm.175 - 306) has produced the only printed edition of this translation based on a manuscript in Paris (BNF Lat.7886), which is not illustrated, and Brussels, BR 10698. The surviving text of this Latin version is incomplete with eighty-five lines missing, and Maass describes this translation as 'barbarous' and often 'nonsensical'.[96] *Aratus Latinus* is not a skillful or polished translation, but is stilted and choppy as the scribe has simply exchanged Latin terminology for the Greek. The author of the *Aratus Latinus* was not adept in Greek and misunderstood parts of the original, which obviously makes for a poor translation, with a wrong division of words and inaccurate interpretations. Unknown words were sometimes just eliminated, which may explain the missing lines. But inspite of its many problems, the *Aratus Latinus* is helpful in following the history of the transmission of the Greek poem in the Latin West.[97] On occasion, the term '*Aratus Latinus*' is misused by scholars

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[94] Lombardo, Stanley. *Sky Signs: Aratus' Phaenomena*, CA: North Atlantic Books, 1983

[95] Wallis xc

[96] Kidd 52-53

[97] Kidd 54

as referring to the whole Latin tradition of *Aratea* manuscripts.[98] An introduction to the current scholarly literature pertaining to the astronomical illuminations of the *Aratea* manuscripts is summarized in the following section.

1.6 LITERATURE CONCERNING *ARATEA* MANUSCRIPTS

The primary source for art historical information on surviving illustrated manuscripts of the *Aratea* is the four-volume study by Fritz Saxl, Hans Meier and Patrick McGurk.[99] Their monumental work includes a survey of astronomical and mythological manuscript illuminations in certain areas of Europe; the United Kingdom, Vienna and Italy. Their massive assemblage is a generalized study, but far from inclusive, and covers a variety of illuminated manuscript traditions over a wide period of time, including Isidore, Bede, and Hyginus. Along with the illustrations of the planets and constellations, they also include planispheres, cosmological diagrams, astrological works and encyclopedic compendiums. Some examples of the miniatures

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[98] Kühnel (2003) 104 Kühnel mistakenly refers to all Latin versions of Aratus' poem as the Aratus Latinus. "A zodiac belt circling the personifications of Sol and Luna is part of the illumination usually accompanying copies of the Aratus latinus, the Latin version of a Greek astrological treatise by Aratus of Soloi of the third century BCE, often included in Carolingian computistical miscellanies." The work of Aratus is not a treatise, but a poem, and is strictly concerned with astronomy, it has nothing to do with astrology.

[99] *Verzeichnis astrologischer und mythologischer illlllustrierter Handschriften des latinischen mittelalters*, 4 parts: 1. *In römischen Bibliotheken* (1915) 2. *Die Handschriften des National-Bibliotek in Wein* (1925) 3. two vols. *Manuscripts in English Libraries* ed. Harry Bober (1953) 4. *Manuscripts in Italian Libraries* (other than Rome) ed. Patrick McGurk (1966).

from the *Aratea* are pictured and discussed; but as expected these are not their primary focus. Many *Aratea* manuscripts are located in libraries outside the confines of their study, such as Holland, France, Germany, Spain, and Switzerland. In another important study, Georg Thiele discusses his research on the relationship of the descriptions of the constellations by Hipparchus and the Aratus illustrations in *Antike Himmelsbilder* (1898). He also presents an art historical analysis of the illustrations on the celestial sphere held by Atlas, known as the Farnese Atlas (discussed in Chapter 2), and relates them to verbal descriptions in Aratus' poem.

Scholarly Literature Discussing the Illustrations of Germanicus' *Aratea*

Of the three Latin translations of the *Phaenomena*, Germanicus' version has attracted the most attention in art historical literature; and of the numerous surviving manuscripts of Germanicus, the ninth-century Carolingian copy, commonly called the Leiden *Aratea*, MS Voss. lat. Q. 79 has been singled out as the most noteworthy and one of the most beautifully illustrated. A facsimile of the Leiden manuscript with commentary was published in 1989, *Aratea, Kommentar zum Aratus des Germanicus, MS. Voss. Lat. Q.79* Bibliotheek der Rijksuniversiteit Leiden, Faksimile Edition and Commentary, 2 volumes, B. Bischoff, B. Eastwood, T.A.-P. Klein, F. Mütherich, and P.F.J Obbema. It is the subject of a small introductory booklet published in 1988 by the J. Paul Getty Museum, written by R. Katzenstein and E. Savage-Smith, *The Leiden Aratea: Ancient Constellations in a Medieval Manuscript*. Their short descriptive text includes two full-size miniatures, Cepheus and Gemini, and one text page of the *Aratea* in color; most of the remaining thirty-seven illustrations are pictured as small black and white images. Their booklet contains a four-page discussion of the history of the Leiden *Aratea*, as

well as a brief general history of the original *Phaenomena* by Aratus and a short paragraph on each constellation, including an analysis of a planetary configuration that was included in the manuscript. This important diagram will be discussed in detail in Chapter 4.

An extensive study of the illustrations of the Germanicus manuscript can be found in the article, "Die Bilder des Leidener Aratus" by Florentine Mütherich. This material will also be examined in detail in Chapter 4. Mütherich also discusses MS Leiden in her essay, "Book Illumination at the Court of Louis the Pious". Mechthild Haffner discusses the illustration of the *Aratea* in *Ein Antiker Sternbilderzyklus und seine Tradierung in Handschriften vom frühen Mittelater biz zum Humanismus* published in 1997. C.L.Verkerk published a report and analysis of those who have written on MS Leiden, "Aratea: a review of the literature concerning MS. Voss. lat. q. 79 in Leiden University Library", in *Journal of Medieval History* 6 (1980) 245-267.

An English translation of Germanicus with introduction and commentary by D.B. Gain, *The Aratus ascribed to Germanicus Caesar* discusses the poem and the transmission of Germanicus' text, but is not concerned with the illustrations. A journal article by Patrick McGurk, "Germanici Caesaris *Aratea* cum Scholiis: A New Illustrated Witness from Wales", *The National Library of Wales Journal XVIII*, 1973, discusses a manuscript of Germanicus' poem held by that library, the manuscript is in two parts, the first was probably produced in the Limoges region early in the eleventh century and the second is probably in an Insular hand of the late eleventh century.[100] McGurk's study of this manuscript explores its possible models and

[100] McGurk (1973) 197

influences. It is discussed in detail in Chapter 4 and Appendix B.

Anton von Euw discusses the Leiden *Aratea* in "Der Liedener Aratus, Antike Sternbilder in einer karolingischen Handschrift", exhibition catalog, Munich 1989, and will include *Aratea* manuscripts from the eighth to eleventh century in a new book not yet published. Munk Olsen has written on the Germanicus illustrations, and discusses the planetary diagram on page 406, 1982. The palaeography of the Leiden *Aratea* text has been analyzed by Bernard Bischoff in *Aratea. Kommentar zum Aratus des Germanicus, MS. Voss. Lat Q.* and referred to also in his investigation, *Manuscripts and Libraries in the Age of Charlemagne.* The Leiden *Aratea* was exhibited with other Carolingian manuscripts and ivories in Utrecht, Museum Catharijneconvent exhibition, August - November 1996, entitled, *Het Utrechts Psalter*. The Leiden manuscript is described on page 12 in the accompanying catalog in which they use the terms Aratus and *Aratea* interchangeably and incorrectly.

Literature Discussing the Planetary Configuration in the Leiden *Aratea*

The planetary diagram included in the Leiden *Aratea*, MS Voss. lat. Q. 79, folio 93v, has aroused much attention from scholars, both astronomers and art historians. Bruce Eastwood has analyzed cosmological diagrams contained in medieval manuscripts for over twenty years, particularly those passed down from Roman authors; Pliny, Hyginus, Calcidius, and Macrobius. He has published an important study, "Origins and Contents of the Leiden Planetary Configuration: an Artistic Astronomical Schema of the Early Middle Ages" that originally appeared in *Viator* (1983) and was later published with his other essays in *The Revival of Planetary Astronomy in Carolingian and Post-Carolingian Europe*, 2002.

In 1898, Georg Thiele was the first scholar to publish information on the Leiden diagram in *Antike Himmelsbilder* on pages 77 and 90. A study undertaken by Marie-Thérèse d'Alverny and published in1975 discusses this Leiden diagram. C. R. Dodwell, *Pictorial Arts of the West*, 1993, discusses the planetary diagram on pages 197 and 422. The fact that the tiny illustrations of the Zodiac and the Labors of the Month found in the Leiden diagram seem to be copied from the Calendar of 354 was discussed by Meyer Schapiro in "The Carolingian Copy of the *Calendar of 354*", *Art Bulletin* 22 (1940) 270-72. Henri Stern's monograph on the famous Calendar, *Le Calendrier de 354: etude sur son texte et ses illustrations*, 1953, also discusses the Calendar's close association with illustrations found within the Leiden diagram, in particular on pages 27, 191 and 249. Michele R. Salzman, in *On Roman Time: The Codex-Calendar of 354 and the Rhythms of Urban Life in Late Antiquity*, also discusses the relationship of the *Calendar of 354* with the Leiden planetary diagram. Katzenstein and Savage-Smith discuss the configuration in their booklet; but some of their information is incorrect, as the astronomical analysis of the planisphere has been updated since their article was written. The original and copy of this most significant planetary diagram and its implications will be discussed in more detail in Chapter 4.

Scholarly Literature Discussing the Illustrations of Cicero's *Aratea*

P. McGurk has published a study that accompanies the facsimile of a manuscript containing a version of Cicero's poem entitled, *An Eleventh-Century Anglo-Saxon Illustrated Miscellany: British Library Cotton Tiberius B.V. Part 1, Together with Leaves from BL Cotton Nero D. II, Early English Manuscripts in Facsimile*, XXI. This too will be discussed in detail in Chapter 4. McGurk refers to *Aratea* manuscripts again in "Carolingian Astrological

Manuscripts", *Charles the Bald: Court and Kingdom*, 1981. The manuscript was listed in the fourteenth century catalog of Canterbury Library, mentioned in, *Mediaeval Libraries of Great Britain*, N.R. Ker ed., London, 1941, p. 28. Cicero's *Aratea* is cited in C. R. Dodwell in *The Canterbury School of Illumination, 1066-1200*; and in Mütherich, *Die Bilder* p. 152; Koehler and Mütherich, *Die Karolingischen Miniaturen IV* and "Die Hofschule Kaiser Lothars", *Lotharingische Einzelhandschriften*, Berlin, 1971, S.101-107; also B. Bischoff, "Die Hofbibliothek unter Ludwig dem Frommen", in *Mittelalterliche Studien*, III, Stuttgart, 1981, S.181. Among the more recent studies of the text are Vire, "les extraits du *de Astronomia* d'Hygin", pp. 801-812; and M.D. Reeve, "*Aratea*", in *Texts and Transmission*, L. D. Reynolds, ed. Oxford (1983) pp.18-24.

Art Historical Books that Discuss the *Aratea*

The scholarly literature devoted to most other surviving manuscripts of the *Aratea* is confined to a brief mention in articles devoted to specific issues, often more focused on the text or the history of the manuscript. When discussing the transition of text and pictures from scroll to codex in *Book Illumination in the Middle Ages: An Introduction*, Otto Pächt utilizes as an example, a 'computistical and astronomical textbook', Metz, MS 3307. The *Illuminated Page* by Janet Backhouse has an illustration of the constellation Cetus, the sea monster, from a Cicero *Aratea* manuscript, BL Harley MS 2506, with eleven lines of description.[101] Her description concerns the English artist; she does not mention the text of Hyginus that is side by side with

[101] Backhouse (1997) 24

Cicero's verses. The *Illuminated Manuscript,* also by Janet Backhouse includes a black and white picture of the constellation Eridanus from the ninth-century Cicero manuscript, Harley MS 647, folio 10b. This description contains fourteen lines.

Treasures of the British Library includes a poor quality black and white illustration of the constellation of Cygnus, the Swan, folio 5v, from Cicero's *Aratea*, BL Harley MS 647; it is explained with one line of text on page 51 in a general discussion of the Harley Collection. *Early Medieval Book Illumination* by Carl Nordenfalk includes one colored illustration on page 9, the Centaur, from the BL Harley MS 647, folio12. The Centaur is accompanied with nineteen lines of discussion. Two striking illustrations from the Leiden *Aratea*, *Cepheus*, folio 26v, and *The Pleiades*, folio 42v, are included in *Carolingian Painting* by Florentine Mütherich and Joachim E. Gaehde, each is a full page colored image and each is accompanied by several paragraphs of description of the manuscript, pages 68-71. *Anglo-Saxon Manuscripts: 900-1066* by Elzbieta Temple and *Anglo-Saxon Manuscripts* by Michele Brown both refer briefly to illustrations in *Aratea* manuscripts of Cicero.

Bianca Kühnel has recently published a comprehensive examination of celestial diagrams in *The End of Time in the Order of Things: Science and Eschatology in Early Medieval Art*. She introduces her scholarly study of *Maiestas Domini* illustrations and incorporates the medieval tradition of cosmological diagrams by comparing the *Maiestas Domini* illustrative tradition with zodiacal diagrams. She also discusses the planetary diagrams that sometimes accompany the Latin versions of the *Aratea*.

Deborah Kahn in *Canterbury Cathedral and Its Romanesque Sculpture* discusses the miniatures of the *Aratea* when looking for prototypes for sculpture in manuscripts. Frances Wormald in *Collected Writings: 1. Studies in Medieval Art from the Sixth to the Twelfth Centuries*, page 42, while discussing the Utrecht Psalter, compares some of its illustrations with the 'Aratus' manuscripts, in particular the representation of Eridanus in BL Harley MS 647. The close similarity between the illustrations of the two manuscripts is described, suggesting that the artists of the Utrecht Psalter might have had access to this manuscript or similar ones, though it cannot be known for certain. He also mentions a set of calendar pictures from BL Cotton MS Tiberius B.V. and its two early English copies which contain 'an Aratus' and a treatise on the *Marvels of the East*, both very fully illustrated as other possible sources of influence for the Utrecht Psalter. The citation consists of about three sentences; and to be more precise, these two manuscripts do not contain 'an Aratus', but sections of Cicero's *Aratea*.

Fritz Saxl refers to *Aratea* miniatures frequently in his essay, "Illuminated Science Manuscripts in England", in *Lectures*, 1957. Saxl and R.Wittkower comment upon some English astronomical manuscripts and reproduce two illustrations in section 3 of *British Art and the Mediterranean*. Panofsky and Saxl also discuss astronomical art in their article 'Classical Mythology in Mediaeval Art' in *Metropolitan Museum Studies*, Vol. IV. They state that the illustrations in BL Harley MS 647 are "closer to the spirit of the Pompeian frescoes than anything else made in the West in the Middle Ages".[102]

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[102] Panofsky and Saxl 236

The scholarly literature concerning *Aratea* manuscripts will be examined in more detail in later chapters, as will the classical exemplars that existed as possible candidates for medieval artists in their search for suitable models to illuminate the constellation cycle. Although this study is focused on the large number of surviving *Aratea* manuscripts and their illustrations, this is a preliminary effort to assemble and bring order to a vast topic. Hopefully, it will clarify some of the misinformation that currently abounds in the art history literature. There is still much more research that could be carried out to further the explanation, clarification and appreciation of this vital and long-lasting poetic and pictorial cycle.

This introductory chapter presented the historical background of the *Phaenomena* of Aratus and the design of the original Greek poem, and then clarified the content and survival of the three primary Latin translations of Aratus' poem. The content and assessment of each of the poems was explained along with their reception and their commentators in sophisticated literary societies of the respective Greek and Roman cultures. The history of the *Aratus Latinus* was also discussed, and the body of scholarly literature, books and articles on related topics, was assembled. This initial section provided the fundamental background material necessary to allow a fuller understanding of the later investigations.

2.0 POSSIBLE CLASSICAL MODELS FOR *ARATEA* ILLUSTRATIONS

Sources for the transmission of the text of the *Phaenomena* can be easily traced since the poem has been thoroughly studied by classical scholars for centuries, but this is not the case for the transmission of the illuminations found in manuscripts of the *Aratea*. Potential sources for the medieval astronomical images could be found in numerous artistic media; wall painting, public monuments, celestial globes, floor mosaics, decorative arts, metal work, coins or vase painting. Some of these probable models will be outlined in the following sections. Among the most obvious sources were >scientific= and astrological illustrations that appeared in early literary works on both papyrus scrolls and parchment manuscripts, and particularly in calendars.

In ancient Rome, the calendar was a vital element of their culture, a part of what it meant to be a Roman citizen, for pagans and Christians alike.[103] In order for the calendar to be effective in governing the events of the changing seasons, it must be accurate and aligned to the orderly motions of the stars and planets. By the first century BCE, the Roman calendar had become disordered, which happens quickly over time if not continually revised. Because it was no longer synchronized with the heavens, Julius Caesar ordered a reform of the calendar in 46 BCE. The

[103] Blackburn 669

mathematical and astronomical calculations of the astronomer Sosigenes, who was assigned the project, provided a more accurate working calendar. The Julian calendar, one of Rome=s great successes, was used throughout the Middle Ages.[104] Calendars were often posted in public places to keep citizens informed, sometimes carved in stone; they also appeared in written form, such as Ovid=s *Fasti*, and were sometimes decorated with pertinent pictures.

2.1 THE CALENDAR OF 354

When searching for possible prototypes for the illustrations found in the earliest surviving copies of the *Aratea*, a most-likely candidate is the *Codex-Calendar of 354*, the only calendar from the time of the Roman Empire, available through later copies, known in its entirety.[105] This lavishly illustrated Roman compendium for the year CE 354 is a likely model for images of the zodiac, planets and constellations in medieval astronomical codices, and in particular, the Leiden *Aratea*. The original *Calendar of 354* did not last beyond the ninth century, but a Carolingian copy was discovered during the Renaissance.[106] This ninth-century codex along with its illustrations was copied copiously in the sixteenth and seventeenth centuries, although none of

[104] McClusky 24

[105] Salzman xxi Another important source for information concerning the *Calendar of 354* is a study published in 1953 by Henri Stern, *Le Calendrier de 354: etude sur son texte et ses illustrations.*

[106] Salzman 70 This manuscript tradition was first clarified by the modern scholar, T. Mommsen, who established that all later copies were derived from the lost ninth-century copy, the Luxemburgensis, a copy of the fourth-century original. The text and illustrations were described by the seventeenth-century scholar and collector of antiquities, Nicholas-Claude Fabri de Peiresc, in a letter which has been published by Mommsen. Luxemburgensis disappeared at Peiresc=s death in 1637.

these are entirely intact, six copies with pictures survive in part.[107] Unfortunately the intermediary Carolingian copy has been lost as well; but the Roman prototype has been duplicated so reliably that the intervention of the ninth-century copyist is hardly noticed. No elements suggestive of the art of the early Middle Ages can be seen in the *Calendar of 354*, not even in the decorative features; the Carolingian artists had a thorough understanding of the Classical style and reproduced it faithfully.[108] This same faithfulness to Classical exemplars can be detected in the ninth-century copies of the *Aratea* manuscripts.

The *Calendar of 354* is only a section of a larger manuscript of more than a dozen varied texts that are joined together as a single book, appropriately called the *Codex-Calendar of 354.* Much more than a calendar, this was a collection of chronological material such as histories, lists of festivals and important dates. This deluxe version of the official Roman Calendar was prepared as a gift for a Christian aristocrat named Valentinus, and composed by the >most famous calligrapher of the century=, Furius Dionysius Filocalus, also a Christian.[109] It included elaborate illustrations of the planets and constellations which employ Classical iconography, the illustrations are possibly the work of Filocalus as well.[110] In the calendar of Filocalus, both pagan and Christian elements are included side by side without a problem, for example, it contains

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[107] Salzman 4 She names the surviving copies, fragments, and descriptions. The Vatican Library has Romanus 1 (Barb. Lat. 2154) and Romanus 2 (Vat. Lat. 9135). A description by seventeenth century scholar Nicholas-Claude Fabri de Peiresc is also in the Vatican Library. Along with these are small portions of the Calendar held in various other libraries. Salzman=s study presents an iconographic analysis and comparison of each picture.

[108] Nordenfalk 8

[109] Salzman 3

[110] Nordenfalk 8 Filocalus was employed as an epigrapher by Pope Damasus (366-84), and he invented a new type of monumental capital letter which was used in the Catacombs.

chronicles of the world since the time of Adam from the Bible, along with chronicles of Roman history from the time of Romulus, including the blessings of the pagan gods and goddesses.

Michele R. Salzman has reconstructed *Codex-Calendar of 354* from the various surviving portions and has published a thorough study of its Roman context, explaining the layout of the Calendar in detail. After the opening dedication page decorated with a calligraphic design held by angels, the codex begins with full-page images of female personifications of the four major cities of the Roman Empire - Rome, Alexandria, Constantinople and Trier - with their identifying iconography. These impressive illuminations were followed by a list of the apotheosised emperors from Augustus to Constantine including the current emperor, Constantius. This section is followed by the seven planets including their legends (missing Jupiter and Venus) and an illustrated calendar page for each month decorated with the Sign of the Zodiac in a small medallion. Facing each calendar page is a full-page miniature depicting a single figure shown in an activity appropriate to that month, accompanied by descriptive verses. Next is a series of lists, feast days, and important days. Bringing the book to a close are the chronicles of Rome complete with a king list from the time of Romulus, and a description of the city itself.

The layout of each calendar page is exactly the same format seen in later Books of Hours and in many medieval manuscripts. It lists the columns of letters applying the typical Roman system of time reckoning, Kalends, Nones and Ides; and each day of the month is noted by the important event or aniversary celebrated on that date, even marking the Egyptian days (*dies*

aegyptiaci).[111] In some copies of the *Calendar of 354*, the page is decorated with architectural devices.[112] The appropriate zodiacal sign is pictured for each month, enclosed in a small circle, a motif that persists in calendars of medieval psalters and sacramentaries. Since it includes much more than a typical calendar, *Codex-Calendar of 354* could be described more accurately as an almanac. The Roman calendar is similar to the numerous almanacs produced in the seventeenth and eighteenth centuries which included lists of important dates as well as astrological lore concerning the planetary week, the zodiac and helpful tidbits of information. The seven planets with their negative and positive qualities are named along with the attributes of the days and the hours over which they preside according to astrological theory. As in most astrological interpretations, Saturn and Mars are negative forces, Mercury, Moon and Sun are neutral, and Jupiter and Venus are beneficial.[113] In ancient Rome, it was not unusual to produce a calendar for a private individual nor to include astrological data, as contemporary sources confirm similar examples of private calendars, and also affirm a growing popular interest in astrology.[114]

Written in fourth-century Rome, the *Calendar of 354* is an invaluable source of information from that crucial period of transition when the imperial administration had moved to the East and the traditional religion of the Roman Empire was converting to Christianity. In

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[111] Every month had two Egypt Days which were bad luck days, a time when certain activities were to be avoided, especially medical treatments and bloodletting.

[112] Nordenfalk 8 He states that we know from Egyptian papyri that it was >already customary to frame tabular texts with ornamental colonnettes= in scrolls of the Hellenistic epoch and this format continued in calendar illustrations remaining popular until the Renaissance.

[113] Blackburn 570 The *Oxford Companion to the Year* gives a full account of the astrological interpretations of the planets and their influence on the days of the week especially for medical conditions.

[114] Salzman 9 She cites writings of Petronius, Juvenal and other literary references that support the conjunction of calendars and astrology.

addition, these most important writings allow insight into the treatment of both text and illustrations during the conversion from the scroll to codex. The *Calendar* is the earliest dated manuscript with full-page illuminations in Western art, and it contains not just one picture cycle, but several sets of pictures from different religious and secular traditions.[115] The quality of the miniatures in the calendar and their superior artistic standards attest to the complexity of their sources. The iconography of the miniatures has religious, secular and imperial dimensions as it was created for a Christian nobleman. The calendar manifests both the >new= full-page illuminations created for the codex as well as retaining pictorial elements that were common in scrolls. Its miniatures exhibit ornamental complexity, as the full-sized figures are embellished with architectural elements, columns and curtains; but the format of the zodiacal images is still in what Weitzman calls the >papyrus tradition=.[116] The Signs of the Zodiac are not full page miniatures, but are inserted into the text pages.[117]

The illustrations of the *Calendar of 354* are especially important for this study of *Aratea* manuscripts because these astronomical images can be accurately dated. Also they are the earliest calendar examples that survive, and hold traces of the images that may have appeared in papyrus scrolls, although it is impossible to determine if papyrus calendars were illustrated, as none survive. The codex format of the *Calendar of 354* coincides with the development of parchment manuscripts and so could not have been produced before the end of the third century.

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[115] Salzman 33

[116] Weitzmann (1971) 106 He discusses various possible models for the illustrations of the Calendar.

[117] In addition to their value as evidence of the transition in artistic styles underway during the Early Christian period, these calendar miniatures are historically important, since four pictures show pagan religious festivals that continued into the Christian era.

It is likely that the codex-calendar was a fourth-century innovation, drawing inspiration from calendars drawn on walls. Thiele, Nordenfalk and others have compared some of the drawings on one folio in particular of the Leiden *Aratea* to those in the *Calendar of 354*, and Salzman continues this comparanda, which will be discussed in greater detail in Chapter 4. Some of the illuminations in the Leiden *Aratea* may have been modeled after the *Calendar of 354*, but there are other possible sources as well. A small number of illustrated manuscripts survive from antiquity that will be examined as potential models for the designs and picture cycles in the ninth-century *Aratea* manuscripts. The calendar tradition passed on poplar and necessary astronomical information, keeping alive the classical iconography, but contained no real scientific information. Potential sources for astronomical iconography, that do retain more technical details, are celestial globes that depict the sphere of the heavens, and the relative positions of the constellations.

2.2 ART OF CELESTIAL GLOBES

The concept of constructing an actual model of the sky, picturing the location of the constellations with the Milky Way and the celestial coordinates, and demonstrating how the stars move as a fixed unit around a central axis, appears to have originated in Greek antiquity. As mentioned in Chapter 1, Cicero records the tradition that Eudoxus had created a star globe that

accurately depicted the constellations.[118] Analysis shows that Aratus used the globe of Eudoxus along with his treatise on astronomy as guides for describing the positions and appearances of the constellations.[119] A direct descendent of the globe of Eudoxus is an extant celestial globe, carved in stone, known as the Farnese Atlas, now at the National Archaeological Museum in Naples. Its name reflects the fact that it was acquired by Alessandro Cardinal Farnese in the early 16th century, and was exhibited in the Villa Farnese.

The Farnese Globe is a second-century CE Roman copy of a Hellenistic sculpture of Atlas on one knee, supporting the heavy weight of the universe on his shoulders.[120] This sculpture is the oldest-known representation of both Atlas and the celestial sphere; the impressive statue stands seven feet tall, shouldering the globe that measures 65 cm. in diameter. Forty-one constellations are carved on the marble sphere, precisely positioned against a grid of reference circles with the reliefs standing out sharply from the background.[121] The constellation figures can be drawn from two opposite perspectives; in the first, the viewers were expected to imagine themselves in a geocentric position within the globe, looking upward at the front of the mythical characters. The other perspective reverses the position of each image, as if the viewer is outside

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[118] Mair 196, Cicero *De re publ.* 14 and *De orat.i.*15.

[119] A nineteenth-century study by Georg Thiele, *Antike Himmelsbild*, 1898 concludes that the constellations as described by Aratus were not based on an earlier version of the Farnese Globe. A connection between the two would be an impossiblity since they differ greatly in the star positions, and also Aratus was not aware of the colures which appear on the Farnese. But the constellations on the Farnese do demonstrate an >absolutely certain basis for the relationship of the sphere to Hipparachus. Thiele logically asks would not an artist who wanted to display Atlas supporting a celestial sphere choose the most famous and widely known version as a model.

[120] Tester 106 Thiele determined the date, based on the Farnese=s artistic styles related to the Hadrian epoch, as before 150 CE.

[121] An article in the *Journal for the History of Astronomy* by Bradley E. Schaefer (May 2005) demonstrates that the Farnese Globe is a depiction of the lost star catalog of Hipparchus. His work follows that of G.Thiele.

the celestial sphere looking at the backs of the figures. Already at this early date, the human figures on the sphere were given the godlike perspective, drawn facing inward, displaying the backside of the constellation figures.[122] This technique of depicting some of the constellation figures from outside the stars became an established convention, found in manuscript illustrations, in the fabulous ceiling frescoes of Renissance palaces, and still appears on modern celestial globes. Few celestial globes survive from before the sixteenth century, but images of the constellations can be seen engraved on astronomical instruments advanced by Arab astronomers, particularly the astrolabe. The archetypal mythology of the stars applied not only to its primary function as a technical devise for organizing the sky. As we have seen, the iconography of the constellations was appropriated from the imaginative depictions in the sky and used for political propaganda by the Caesars, but it was also taken over by religious cults and even by Christianity.

[122] For a discussion of this concept, see Thiele and Stevens, AThe Figure of the Earth in Isidore=s *De natura rerum*@, in I*sis*, 71 (1980): 268-277.

2.3 ZODIACAL ART IN THE CULT OF MITHRAS

Mithraism, one of the most successful mystery cults pervading the Roman Empire, cannot be overlooked when investigating the sources of astronomical artwork. An extremely rich iconographic cult program, centered around cosmological imagery, has been preserved in Mithraic sites; but as a result of the utmost secrecy required of its members, has been especially difficult to decipher. A plethora of cosmically-inspired statuary, the Dioscuri, Aion, Phanes, and the unnamed lion-headed god with the Signs of the Zodiac on his male body, have been excavated in their temples. But the dominant artwork, an enigmatic cult image called the tauroctony, seems to have been a essential part of their devotional activities, present with slight variations in every Mithraic temple.[123] The Mithraic-centered religion began to spread throughout the Empire in the first century CE, attained its peak in the third century, but was effectively wiped out by Christianity by the end of the fourth century.[124] Fortunately hundreds, perhaps thousands, of Mithraic temples, decorated with cryptic astronomical frescoes and sculptures, survive as witnesses to its success, scattered through all parts of the Empire, discovered everywhere Roman soldiers were posted.[125] In addition to military devotees, wealthy merchants and educated laymen were also Mithraists, members of this all-male secretive and exclusive cult. Undoubtedly their utilization of caves or underground locations for their preferred places of

[123] Ulansey 6
[124] Ulansey 4
[125] Mithraic temples have been found in sites as wide spread as Hadrian=s Wall (3), North Africa, Germany, and Dura Europus. One of the largest in Italy was found under the Church of St Celemente in Rome.

worship improved their chances for survival. The interiors of Mithraic temples were mostly dark, candle lit, and relatively small, many with space to hold only a dozen or two participants.[126]

The abundance of cosmological references in the artifacts excavated from the ruins of their temples provides proof that the cult maintained an astrological focus.[127] Ceilings of the caves or subterranean temples were designed to simulate the night sky. Recent research has suggested that some of these sanctuaries were actually used as observatories and that holes were drilled in the walls and ceiling for specific astronomical purposes.[128] The majority of the temples are designed on an east B west axis with a single entrance from the west leading the participants to the focal point of the room - the carved or painted relief of Mithras - >Slaying the Bull=. The cult icon consists of an image of Mithras astride a massive Bull, depicted with the god are a snake, a dog, a raven, a cup, a scorpion, and occasionally a lion. The dog and snake are pictured striving for the sacred blood flowing from the knife wound on the sacrificed bull, the scorpion appears near the bull=s genitals, and Signs of the Zodiac usually surround the whole scene. The central figure, Mithras, is always clad in Eastern garb, his wind-blown cape decorated with stars, and his exotic costume topped off with a Phrygian cap.[129] The youthful god turns his head away from the suffering bull and gazing skyward, he plunges his knife deep into its shoulder. The

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[126] In Ostia alone, there were fourteen Mithraic temples scattered throughout the town, varying in size from 56 x 18 [the largest] to 26 x 14 [the smallest]. Imagine how many mithraea have been lost through time and religious fervor, or more optimistically, still remain to be uncovered.

[127] The lack of written documentation has hampered scholarship on the Mithraic mysteries as adepts of the cult were compelled by sacred vows of secrecy not to reveal their beliefs, activities or rituals. The only contemporary references are usually filtered through Christian sources which tend to present biased or derogatory accounts.

[128] Ulansey 17 His complete investigation and interpretation of the artwork can be read in his recent book, *The Origins of the Mythraic Mysteries*, which is too complicated to be included here.

[129] See also, F. Saxl, Mithras I and Mithras II, *Saxl Lectures*, (1957) 13-44.

iconography of this cult scene has recently been subjected to exciting new interpretations. Mithraic scholar, David Ulsaney, has constructed a very convincing argument that every figure poised on the Mithraic icon represents a constellation and Mithras himself personifies the constellation of Perseus. Moreover all of these constellations are aligned between Taurus and Scorpio. Taurus the bull, Canis Minor, the dog, Hydra the snake, Crater the cup, Corvus the Raven, and Scorpio the scorpion all fall on the celestial equator; and in the identical order usually seen on the icon.[130] Included also in this Mithraic pantheon are two torchbearers, Cautes and Cautopates, attired as smaller versions of Mithras with chiasmic-crossed legs. The iconography of the two companions points to an association with spring and fall, the equinoxes. The cosmic tableau of the mithraeum is gradually divulging its mysteries and the reinterpretation of the cult iconography gives more credence to the power of the heavens in the daily life of those living in former times. Artistic remnants of the Mithraic tradition provide an excellent example of how astronomical information could be encoded into the iconography of artworks. The astronomical art, statuary, and images of the cult of Mithras, prevalent throughout the vast area of Roman occupation, also provides abundant representations of existing iconography available for adaptation by manuscript illustrators.

[130] Ulansey credits a 19th century German scholar K.B. Stark for first proposing an astronomical explanation, which was dismissed by Franz Cumont, and so ignored until the 1970's.

2.4 ZODIACAL MOSAICS IN THE ROMAN WORLD

In addition to the previously-mentioned exemplars, another likely model for astronomical imagery is the artwork of mosaics. Mosaic floors were universal in the ancient world and have been uncovered in numerous sites throughout the Roman Empire from Syria to North Africa. Since mosaic images formed from the stone, marble and glass tesserae are long-lived compared to the more fragile papyrus, they are an important record of iconographic forms surviving from Late Antiquity. Mosaicists of the time relied upon the familiar and cherished designs of history, religion, and mythology. Popular themes of the calendar, the Signs of the Zodiac, and especially female personifications of the four seasons appeared in a wide variety of artistic creations in both public and private monuments during classical times. The symbols of eternal time, often centered on the figure of Aion, god of eternity, appearing in the heavens, and the heros and heroines who enacted the myths were customarily found in floor mosaics.[131] The themes with importance for this study are the mosaic reproductions of the zodiac and the constellations.

NORTH AFRICA

Over eighty floor mosaics depicting the four seasons have been discovered in North Africa, typically found in private homes, decorating ancient Roman dining rooms and dating from the second to the fifth centuries.[132] The four seasons were an attractive motif alluding to good fortune, good harvests and prosperity as well as to the calendar year. The seasons are most

[131] Parrish 15

[132] Parrish 11

commonly represented by personifications in the form of female busts, adorned with appropriate fruits and flowers, which could conform to designs in corners or in circular patterns.[133] A frequent companion to the four seasons in African floor mosaics is the well-known image of Aion whose attribute is the eliptical band of the zodiac.[134] Sometimes iconic images of Helios and Luna appear with the zodiac and the four seasons.

TUNISIA

The most complete zodiacal floor mosaic among those discovered in North Africa was found in Central Tunisia near Zaghouan, dated to the third century, this mosaic has been removed and can now be viewed at the Bardo Museum in Tunis. The quality of the workmanship is remarkable, both for its intricate geometric design and the detailed portrayal of the human and animal figures. The composition of this carpet is quite different from those that survive in Jewish synagogues. Instead of a circular pattern divided into twelve pie-shaped sections, this mosaic is a six-sided design which holds a six-pointed star. The Signs of the Zodiac are in small alternating roundels and six-sided geometric forms, four have been damaged, Gemini, Leo, Virgo and Sagittarius. A smaller star fills the center of the design; each of its six points carries a bust of one of the >six planets= with the seventh, Saturn, holding his scythe, at the center. Birds, animals and stone-like patterning are inserted to complete the picture. Many more examples of zodiacal

[133] Parrish 21 Female busts or heads appear in forty-three mosaics and fourteen examples show males, usually putti or young men. Sometimes the seasons are in the proper chronological order, but in other examples, the arrangements employ different sequences.

[134] Parrish 46 The god of eternity appeared in both imperial and private Roman monuments, sometimes as a youth but often as an elderly man. He is found in connection with Mithraic cult sites as well.

floor mosaics are extant from the Roman World, but the most remarkable are those found in ancient Jewish synagogues.

2.5 ZODIACAL MOSAICS IN ANCIENT JEWISH SYNAGOGUES

During the Roman-Byzantine period, those villages or towns which had a Jewish community also had a synagogue and possibly even more than one. In ancient Palestine alone, over 100 synagogues, dating from CE100 to 600, have been uncovered in archaeological investigations. These religious assembly buildings were designed in a variety of styles and the type of decorations found within them reflected the current cultural tastes of the larger Roman-dominated society, but were deliberately and consistently adapted to meet the beliefs and ideals of the Galilean Jews. Like most Roman public and private buildings of the time, the floors of the synagogues that have been uncovered are typically decorated with mosaic pavement as well; but surprisingly, the Jewish religious images and symbols in the mosaics often appear alongside pagan symbols. In addition to the menorah, ram=s horn and tabernacle are found: the eagle, symbol of imperial Rome, naked cupids holding Greco-Roman wreaths, and winemakers pressing grapes in a Bacchic scene. Most unexpectedly, in some of these ancient synagogue floor mosaics, a central position has been devoted to astronomical/astrological imagery. Examples of the diagram of the Zodiac along with images of the zodiacal constellations have been discovered in synagogue mosaics at seven archaeological sites (so far) in ancient Palestine dating from the

fourth to the sixth century: Beth Alpha, Hammath-Tiberius, Husifa, Khirbet Susiya, Na=aran, Yafia, and the lately-discovered Sepphoris. At another site, Ein-Gedi, there is no zodiacal diagram but a list of the Zodiac signs appears in a floor inscription. Bianca Kühnel distinguishes these elaborate floor mosaics as >one of the most authentic creations of Jewish art=.[135] Isolated pictures of capricorn and fish appear at the excavated synagogue of Dura Europus, but are probably not zodiacal.

Jewish religious principles and the Second Commandment forbid polytheism and depiction of images of God or Yaweh; so it was quite surprising to find images of Helios, the Roman Sun God, and representations of the pagan mythological world, combined with scenes from Jewish sacred scriptures. These surviving zodiacal mosaics are relatively consistent in the symbolism that they include, as well as what they exclude. Although the image of Helios dominates the center of the Zodiac, I find it odd that in these scenes his counterpart Luna or Selene, is either omitted entirely or reduced to an insignificant crescent moon. The Moon Goddess, whose iconography portrays her steering a cart, pulled by two oxen or cattle and holding a torch, does not appear in any of the synagogue mosaics. The symbolic Sun and Moon are usually pictured side by side, or one above the other in the center of the twelve constellations. The abstract diagram of the zodiacal sphere was not an invention of Jewish synagogue artists, but was envisioned long before in Roman art.[136] The appearance of the Signs of the Zodiac in mosaics, decorative arts and even coins was well-established in Roman times especially with

[135] Kühnel 43
[136] Kühnel 42

among aristocrats, even Constantine used astrological symbolism on his coins.[137] But zodiacal mosaics were adopted by the Jews from non-Jewish sources and were maintained for centuries, even after Christians had mostly ended their use of this symbolism in architectural contexts. Religious historians are still searching for justifications for this seemingly sacrilegious iconography that decorated many ancient synagogues.

BETH ALPHA

The Beth Alpha floor mosaic, discovered in 1928, is the best preserved and most highly publicized of the surviving synagogue zodiacs, and is pictured in many art publications.[138] The Beth Alpha synagogue had been destroyed in an earthquake, but fortunately for historians, the important mosaic design had been protected by a layer of fallen plaster. As a result, these center floor mosaics are in an excellent state of preservation, while the mosaics in the eastern aisle, narthex and courtyard were mostly destroyed. Information about the artisans who laid the floor, Marianos and his son Haninah, is provided by two inscriptions, in both Greek and Aramaic, along with the names of donors and the date of the dedication of the synagogue, during the reign of Justin I, the early 6th century.[139]

The Beth Alpha mosaic is divided into three separate panels; each of the panels is surrounded by an ornate border, and all are designed to be viewed from the north. The first section shows Abraham preparing to sacrifice Isaac; the panel closest to the pulpit and apse holds

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[137] Fine 90

[138] For example, the Beth Alpha zodiacal mosaic is pictured and discussed in Snyder=s *Medieval Art*, p. 6, where it is misnamed the >Sacrifice of Isaac= mosaic.

[139] Negev 55

a depiction of a tabernacle flanked on each side by a menorah, a ram=s horn and other symbolic Jewish articles. The religious objects in these two divisions are scattered about to fill the neutral ground, a technique scommon to late Roman mosaic pavements. Our main interest is the square central panel containing the zodiacal diagram divided into twelve equal sections, each holding its appropriate constellation figure identified by an inscription in Hebrew. Every constellation is shown in its recognizable form, but presented in an un-classical manner, more amateurish and awkward in their rendering. The center of the circle is filled with an image of Apollo/Helios driving his four horses, each of the four is individualized in a slightly different way. The bright rays of light coming from Apollo=s head form a golden crown, only his head and neck are seen; on the Sun God=s left is a tiny crescent moon, stars fill the background, most of which have fallen to the bottom of the circle, indicating the starry night is being eclipsed by the rising sun. The Signs of the Zodiac are read in the usual counterclockwise direction, but begin with Libra in the ascendant position, which is unusual. More often its counterpart or opposite sign, Aries, as the sign of spring and the vernal eqinox is in that prime position.

In the four corners of the square that encloses the Zodiac are personifications of the Four Seasons, female half-figures with wings, shown with appropriate attributes, each is inscribed with its Hebrew name.[140] The Four Seasons are arranged counterclockwise as well. The artistic workmanship of this multi-colored pavement is of a lesser quality than some of the other Jewish mosaic floors, such as the one at Hammath. The Beth Alpha artisans were more accomplished in

[140] Ness, Diss. Chapter 5, p. 5. ASpring, or Nisan, holds a shepherd=s crook, for example, while Summer, or Tammuz, sits among fruit and grain crops. Fall has a star overhead, as at Na=aran. Winter is marked by red cheeks.@

their creation of abstract patterning than in their human and animal likenesses, as the braided bands that make up the circles of the Zodiac are very carefully and artistically executed.

EN GEDI

En Gedi, a popular oasis in the Judaean desert, had a large Jewish community during the early Byzantine Empire.[141] The ancient synagogue there was chanced upon by farmers in 1966 and evcavated in 1970-72. The archaeologists concluded that the synagogue had three phases with the zodiac inscriptions belonging to the latest phase, which was finally destroyed by fire around 530 CE.[142] An important inscription was uncovered in the western aisle, one of the longest ones yet found; and it contains a list of both the twelve Signs of the Zodiac and the months in Hebrew, among the other inscriptions.[143] The circular diagram of the Zodiac, with at least seven known examples, was not found here; but instead a zodiacal inscription appears, the only known instance of this format. The zodiacal signs are followed by the listing of the twelve Jewish months, another rare appearance among synagogue inscriptions.

HAMMATH-TIBERIAS

On the shore of the Sea of Galilee, the Hellenistic city of Tiberias, named for our emperor Tiberius, was renowned in antiquity for its theraputic hot springs; a famous Roman temple dedicated to Hygiea, goddess of health, was constructed there, as well as several synagogues. A fourth-century synagogue mosaic discovered in 1947 at Hammath-Tiberias is among the earliest

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[141] Ness, Diss. Chapter 5, p. 12

[142] Ness, Diss. Chapter 5, p. 13 He reports that a cache of a few thousand bronze coins was discovered at the site which provide conclusive dating. Because of its isolated location, the site had never been looted and provided numerous artifacts.

[143] Fine 198

zodiacal floors yet found; its artistic conception and workmanship is far superior than many of the later synagogues. The entire floor of the building was decorated with richly-colored mosaic patterns of brown, orange and beige of the finest quality, even when compared with contemporary public and private mosaic work.[144] Its classical style is its most impressive feature, quite different from the more >primitive= style of the other Jewish mosaics.

Unfortunately a later stone wall was constructed right through the circular diagram, obliterating part of the central design along with four constellation figures. The Zodiac found at Hammath is similar to the other synagogue floor designs with its inclusion of pagan and Jewish symbolism, although the entities are kept separate and do not intermingle. This mosaic floor is also divided into three sections each with a distinctive border; the portion closest to the entrance consists of nine sections, each with inscriptions in Greek. The middle section is decorated with the familiar zodiacal pattern, and the third part depicts an Ark or Tabernacle, flanked by a menorah and ram=s horn on either side.[145]

The center of the diagram has a splendid, but partially-damaged Helios, attired in Imperial Roman style with a cloak decorated with a large circular pin. His youthful face is beardless, and encircling his light-tinted hair is a shining halo emitting seven rays of light. His right hand is raised as if blessing and his left hand holds a whip and a globe with two circles

144 Negev 166 They were probably created by foreign artists, while local artisans, a father and son team, executed the designs on the floors at Beth-Alpha and Beth-Shean which are of much less quality.

[145] Negev 167

intersecting.[146] The chariot in which Helios rides has been destroyed, but it seems to emerge from the waves of the sea visible in the lower part of the inner circle; the sky behind him shows only one large star on his left and a pale crescent moon on his right. The twelve Signs of the Zodiac are symbolized in their usual Hellenistic portrayals, even including nude, uncircumcised male figures for Libra and Aquarius and every month has its name inscribed in Hebrew.[147] Aries and Aquarius, for some unknown reason, are written in mirror image.[148] Each of the four corners displays the head of a young maiden holding fruits emblematic of her season, and they are placed in correct conjunction with their corresponding months.

HUSIFA or ISFIYA

The third zodiac was discovered in 1930 in the ancient synagogue at Husifa located on Mt. Carmel not far from Haifa. The building was oriented toward Jeusalem, but it had been destroyed by fire, perhaps during the reign of Justinian.[149] Only half of this site has been excavated since it is under modern buildings, but a rich mosaic carpet was uncovered there. Originally the whole floor was covered with mosaics, but now badly damaged, due to the ravages of time, not iconoclasts. In the nave, traces of a dedicatory inscription survive, a geometric carpet and the zodiacal diagram. The layout of the designs seems to have been similar to the other recovered mosaics. The zodiacal panel is closest to the east end of the building and

[146] One author calls the globe a shield, but this could not be correct, as a shield is never held in the palm of the hand.
[147] Ness, Diss. Chapter 5, p. 10 Ness suggests that perhaps the mosaic was made by gentile workmen.
[148] Fine 198
[149] Ness, Diss. Chapter 5, p. 6

consists of two circles inscribed on a square; the smallest of the Zodiacs found so far.[150] The inner circle is almost entirely destroyed and none of the central figure can be seen.

The north corner of the outer square is intact, holding one of the Four Seasons, a female head adorned with grains and pomegranates, symbols indicative of fall. Fragments of the five signs from Sagittarius to Aries can be identified; and they were designed in a similar manner to those at Beth Alpha, running counterclockwise. Sagittarius at both of these sites is a nude human figure, not a centaur, holding a bow, and covered with a cloak, similar to the lion skin of Hercules. Looking at Capricorn, only his horns remain, but Aquarius is mostly intact, not the expected male figure pouring water, instead a lonely jar with a stream of water flowing forth. The fish of Pisces are very damaged, only the fin and tail can be recognized; the ram of Aries has but the tip of its tail and hind hooves remaining. The Husifa mosaic has not been positively dated, but its similarity to the Beth Alpha and Na=aran mosaics allow it to be placed with comfort in the fifth or sixth century as well.[151]

KHIRBET SUSYIA

Traces of a zodiacal diagram, along with a scene of Daniel in the Lions= Den, were discovered at Khirbet Susyia in an ancient synagogue near Hebron in the south of Palestine. The site was surveyed in the nineteenth century and excavated in 1971-72, revealing a complex history.[152] The synagogue was active from the fifth to the eighth or ninth centuries. Only traces survive from the various levels of the floor mosaics, but there is enough evidence to suggest a

[150] Ness, Diss. Chapter 5, p. 7
[151] Ness, Diss. Chapter 5, p. 7
[152] Ness, Diss. Chapter 5, p. 10

zodiacal circle. The Biblical scenes and the zodiac wheel from the fifth century were removed and replaced by a more neutral and less controversial floral and geometric carpet of cruder quality in the sixth century.[153] Part of the wheel can be distinguished, and since zodiacal diagrams are commonly found in early synagogues, it is >probably reasonable= to add this site to the list of Zodiacs.[154] It is possible that this mosaic may have been destroyed by iconoclasts, as was the mosaic at Na=aran.

NA=ARAN YAFIA

In 1918 a German bomb exploded in Na=aran, 2 2 miles north of Jericho, accidentally exposing a mosaic pavement of an ancient synagogue that had survived from antiquity in excellent condition, the first ever discovered. The date of the mosaic=s production is still debated by archaeologists, somewhere within the fifth and sixth centuries.[155] The mosaic floor (22 x 15 meters) had been decorated with many birds and animals that had been deliberately and carefully removed in the eighth or ninth centuries; it is presumed that the destruction had been carried out not by anti-Jewish fervor, but by Jewish iconoclasts during a time of strict religious orthodoxy.[156] Even though vandalized, enough of the floor remains to permit an accurate reconstruction. The zodiacial diagram appears in a large square panel containing two concentric circles with Helios in the center as usual, driving his chariot or quadriga. Here, as was the case with the other living

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[153] Fine 95 There is evidence of other iconoclastic activity at Susiya, as images of animals and human figure were removed from the screens surrounding the main bema.

[154] Ness, Diss. Chapter 5, p. 11

[155] Negev 273

[156] Fine 84 After the remove of the sacrilegious images religious lifeof the community seemed to continue as it had in the past.

things in the mosaic, the figure of Helios or Sol Invictus and the faces of his four horses have been gouged out leaving only the wheels of the chariot, the rays of light coming from his halo, his whip, and his cloak decorated with stars. But utmost care had been taken not to damage the names of the months as they were written in Hebrew, the sacred language.[157] The zodiacal signs are badly damaged; but from what remains, seem comparable to other synagogue mosaics in their iconography. Virgo can be recognized, although only the outline of her form survives, the body of Scorpio is gone, but its many legs indicate its former existence.

In the corners are female personifications of the Four Seasons that are damaged, but are identified by their Hebrew labels.[158] The seasons are marked with appropriate symbols; Spring with a tree and a bird, Autumn displays a star. The seasons are arranged counterclockwise, but the constellations are read clockwise. Also the Four Seasons do not align accurately with their associated months; Spring for example is next to Virgo and Libra, instead of Autumn. In addition to the zodical pattern, the floor was decorated with the image of a Torah Shrine flanked by two menorot, nearby was a scene with Daniel between two lions that had also been ruined. The symbolism depicted in the Na=aran mosaic is similar to that in other synagogue mosaics; and the workmanship is distinctive, but not outstanding. The most astonishing feature about this work is the scale of the vandalism it has suffered and the selectiveness of the destruction. The zealots attacked only animals and humans, especially their faces. Plant life, Jewish symbols, and Hebrew

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[157] Sacred writings in Hebrew could not be destroyed, but if no longer usable, were kept in the genizah found in every synagogue.

[158] Ness, Diss. Chapter 5, p. 4 AEach season was named for one of the Jewish months it contained. Summer is Tebet, for example.@

inscriptions were left unharmed, implying that the vandals were Jews, prompted by religious motivation.[159] Although each zodiacal mosaic has its own distinctive features, the most intriguing is the one excavated at the celebrated city of Sepphoris.

SEPPHORIS

The most recently discovered zodiacal mosaic was uncovered in 1993 in the Sepphoris Synagogue which was built in the first half of the fifth-century and destroyed at the end of the Byzantine period, mid-fifteenth century.[160] Recent excavations at Sepphoris have detected more than forty mosaic floors found in both public and private structures, rating the city as one of the most important sites in the ancient world for its wealth and variety of mosaic decorations extant from the third to the sixth centuries.[161] The Sepphoris mosaics are noted not only for their quality and richness, but for their iconography and style. This synagogue mosaic is the most spectacular in its size, layout, and extensive pictorial design; its arrangement of fourteen panels has been

[159] Ness Diss. Chapter 5, p. 4

[160] Located in Lower Galilee, Sepphoris has a rich history going back more than 2000 years, rebuilt by Herod Antipas in the early first century and ruled alternately by Romans, Jews and Christians. The city of around 30,000 people was quite cosmopolitan and became a renowned center for learning.

[161] Weiss 10

compared to the extensive mural design at Dura Europa.[162] Because of its key location, design and dating, this mosaic is crucial for the interpretation of the whole group of Jewish Zodiacs.[163]

This huge synagogue floor measures 46 x 16 feet, and is divided into seven horizontal sections of unequal height; the other synagogue floor mosaics are all divided into three panels, with the Zodiac central in the design. Like the other synagogues, a scene is devoted to Abraham and Isaac, and another area depicts the Tabernacle and Temple at Jerusalem, as anticipated, the familiar zodiacal diagram was found in the central area. The mosaics at Sepphoris, especially the zodiacal configurations, are exceptional for their rich details. The plan of this Zodiac consists of two concentric circles within a square. In the center is the quadriga of the Sun God, Helios, with its four horses; but the handsome figure of Helios himself, holding the reins of his horses, is missing, not destroyed by iconoclasts, but purposely omitted and replaced instead by an image of a brilliant sun disc, with ten shining rays of light spreading out in every direction. The four horses fill much of the circle and are depicted in profile, two gallop to the right and two to the left.[164] The riderless chariot is depicted frontally, facing the viewer with wavy blue lines

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[162] Weiss 15 This is not to suggest that the makers of the Sepphoris mosaic were directly influenced by the wall-paintings at Dura Europus, but instead, that both groups of craftsmen drew from a tradition that was common in the Roman East. If this is correct, it is possible that more examples arranged in this manner may still be found in Israel. This mosaic forms a link between the third-century frescos of Dura Europus and late Byzantine and medieval illuminated manuscripts. In addition, the scenes of this mosaic may provide indirect evidence for the existence of illustrated manuscripts of Biblical material in the Jewish community, which may have been models for the mosaic at Sepphoris.

[163] Kühnel 31 She calls this mosaic >the until-now missing link=, as it is intermediate between Hammat Tiberias and Beth Alpha.

[164] Kühnel 39 She remarks that Aaccording to an ancient Roman tradition, the four horses of Sol=s quadriga were linked to the four seasons and also the times of day: *Huic quoque quadrigam scribunt, illam ab caussam, quod aut quadripartitis temporum varietatibus anni circulum paeragat; aut quod quadrifido limite diei metiatur spatium* (Fulgentius, *Myth.* 1.11)

resembling water filling the lower part of the circle; perhaps it portrays the sun rising from the sea.[165] Next to the fiery Sun is a slightly smaller Moon showing its crescent form made with white tesserae, as if shining, tucked inside its full face, colored dark brown; a single large star glows beside it.

The Signs of the Zodiac are represented by their customary symbols and in some months, as youthful figures performing labors as well; each Sign and the name of each month is labeled in Hebrew and those sections not damaged include a large lonely star. Only four of the months are intact, Libra, Scorpio, Sagittarius, and Pisces; the rest have varied amounts of damage; but at least one detail of each Sign can be positively identified. Aries is placed in the ascendant position and the signs are read counterclockwise, as in astrology charts. The house of Gemini at Sepphoris is especially significant; the two youthful males, are depicted frontally, naked and embracing; but do not carry their usual spear and shield. The young man on the left grasps a club, and the one on the right appears to be holding a stringed instrument, these items are the iconography indicative of another set of mythical twins, Amphion and his brother Zethus, who are often interchanged with Castor or Pollux.[166] The familiar busts of the Four Seasons occupy the spandrels, personified in the form of women; each is adorned with harmonious fruits or flowers. Overall, the most amazing feature of the Sepphoris mosaic is the absence of Helios since every other depiction of this zodiacal diagram included his image; here his chariot is empty except for the rays of the sun which reach to fill it. The deletion of the anthrophomorphic Sun

[165] Neptune is often shown in a similar way, riding in a chariot rising from the sea, perhaps their iconography has been intertwined.

[166] This switch in the iconography of Gemini will be discussed in more detail in Chapter 4.

God in this single instance raises many challenging questions. This mosaic floor traveled on exhibit to four cities in 1997 and 1998 including Pittsburgh=s Carnegie Museum.

YAFIA

The last example to be discussed is a possible zodiacal diagram, discovered in a Jewish synagogue in 1921 at Yafia, an ancient village about a mile from Nazareth, dated to the late third or early fourth century. The mosaic floor was excavated in 1951, but because the site is occupied by a modern village, only a small area could be uncovered. Later construction or remodeling had damaged the ancient synagogue, but enough survives to indicate that it was a basilica, with a double colonnade, and two aisles; and that it had been violently destroyed.[167] This synagogue floor had been covered with an elaborate mosaic carpet, but is in a ruinous condition; therefore the entire design cannot be known for certain. Remains of a double circle were excavated that was originally thought to be another of the familiar zodiacal patterns. But the space between the circles is not divided into pie-shape sections; instead it is filled with smaller circles with traces of animal figures. Parts of the inscriptions can be read, and scholars now suggest that the twelve smaller circles are symbols indicative of the twelve tribes of Israel; some suspect that other zodiacs may also refer to the twelve tribes. There seem to be commonalities between the twelve signs and the twelve tribes, so perhaps the mosiac floor in this synagogue does have astronomical references, although it is too damaged to be certain.

[167] Ness, Diss. Chapter 5, p. 11

Interpretations of the Zodiac Cycle in Jewish Synagogues

The mystifying question as to what the zodiacal diagrams in synagogue floor mosaics actually meant to the Jewish people has spurred scholars to seek explanations from the time they were first discovered. These images of the Four Seasons, the twelve months, the Sun God, and the Signs of the Zodiac remind the viewer of both the rhythmic pattern of nature and its interaction with eternal cycle of the heavens. In ancient cosmology, the microcosm of the earthly sphere is a reflection of the macrocosm of the celestial sphere. Religious scholars suggest that the Sun God, the powerful figure driving his chariot, was intended to stimulate the audience to imagine God, not in human terms but in celestial terms, as a reminder of God=s omnipotence, that God is the invisible force that drives the universe, its stars, seasons and human labors. But that still does not answer the question, why was the well-known pagan image of a Greek god, encircled with the constellations of the Zodiac, adopted for the central position in Jewish synagogues?

Depictions of the Four Seasons and the Signs of the Zodiac with Helios and Luna in the center were familiar icons taken over from art of the Hellenistic era and Late Antiquity; but the combination of these themes, minus Luna, with scenes of Abraham along with symbols of the Tabernacle and Ark can be found only in ancient synagogues. The earliest example of the three-part mosaic occurs in Hammat-Tiberias, fourth century; Sepphoris was created in the fifth century; Beth Alpha, Khirbet Susyia, Na=arn and probably Husifa date from the sixth century. Appearing in synagogues repeatedly for over 300 years implies a consistency of purpose and a

traditional significance for this pictorial pattern. Consider how many more may yet be uncovered, or might have been destroyed over the past millennia.

Some historians consider the appearance of the Zodiac in synagogues in the same manner as they interpret the sculpted Zodiacs that appear on the west facade of many Romanesque and Gothic cathedrals. Those who commissioned the use of this multi-purpose astrological symbol relate it to the calendrical cycle of time, the yearly cycle of the four seasons and the formation of the heavens by the creator, with no suggestion of astrological implications. In the same way, the idea that the image of the Zodiac in a Jewish religious setting had any astrological undertones has been thoroughly rejected by religious historians. But the recent doctoral dissertation by Lester J. Ness, expressing an opposing view, has been turned into a book in which he investigates how the Jews of the Hellenized world >adopted and adapted astrology=.[168] Ness provides a thorough summary of modern research on the topic of astrology and Jewish art, and suggests that astrology was part of Hellenistic science and philosophy that Jewish theologians could not ignore. Astrology was seen as an emblem of the power of YHWH in managing the world and caring for His chosen people, and that representations of the Zodiac in the synagogues were symbolic of His power and concern for His creation.[169]

The zodiacal floor mosaics are a subject of considerable research among religious historians and archaeologists, and their symbolism and function in Jewish synagogues is still

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[168] Ness, L.J. His dissertation, *Astrology and Judaism in Late Antiquity*, 1990, has recently been published in book form, *Written in the Stars.* The floor mosaics are examined as an important piece of evidence in the development of his thesis.

[169] Ness, diss. chapter 4, pg. 16

being debated. Herbert Kessler stresses that in this early period, there is no doubt that >Christians and Jews were in conversation with one another=.[170] He doubts that there was one simple pictorial tradition and suggests that there was cross-fertilization between the cultures. Other scholars interpreted the mosaics as >expressions of Hellenistic mysticism=, as >meaningless decorative elements=, or having >a cosmological interpretation= or >an imperial one=, as well as >a Jewish calendar with a practical purpose=.[171] John Wilkinson in *From Synagogue to Church* has written a critical analysis of the sizes, proportions and layouts of the early synagogues, using the zodiacal mosaics as crucial components for his study. Often the Zodiac is in the center of the mosaic floor and Wilkinson compares the center of the synagogue with Jerusalem as the center of religion and the world, and relates this theory to the synagogue Zodiacs. Suggestions that the zodiacal scene represents the calendar have been made; but the facts dispute this possibility. At Na=aran the Zodiac signs go round clockwise, but the seasons counterclockwise; and at Beth Alfa the Zodiac signs do not match the seasons. To a viewer who wanted to use these designs as guides to the calendar, such errors could not be tolerated.[172] The three themes: Abraham and his son Isaac, the zodiacal circle and symbols of the Tabernacle and Temple at Jerusalem are represented as a thematic unit in all of the mosaic floors. An explanation of their symbolism as a group has not been definitively accepted by religious

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[170] Kessler symposium paper delivered on September 14, 1997, at international conference held in conjunction with the Sepphoris Mosaic Exhibition, Revealing an *Ancient Message: A Synagogue Mosaic from Sepphoris*, in New York. The report on the symposium is published in the Jewish Heritage Report, Vol. I, Nos. 3-4/Winter 1997-98.

[171] Kühnel 36 She writes Atexts characterize the Jewish attitude to astrology as clearly differentiated: a line was drawn between cosmic phenomena and the pagan gods associated with them in Hellenistic thought and art. As long as astrology did not lead Jews to worship the gods of the planets, it was not seen as an active danger@.

[172] Wilkinson 91

historians. Because of their impressive numbers and key locations, the mosaics need to be considered as part of official dogma.[173]

The artwork of the ancient synagogues has set in stone the ideas and beliefs of those who worshipped there. The fact that the zodiacal symbolism was at one time accepted as suitable decor, and then later no longer permitted invites great interest. Some of my questions are: would these floors, bearing traditional sacred images, have been walked upon? If the designs had been covered with a carpet, the images would not be visible and its symbolism lost. How would the images on the floor interact with the religious services or activities in the synagogue? Why would Jews display in their synagogue a Hellenistic Zodiac, especially since they used a lunar rather than a solar calendar, and why would they adopt a prominent Greek god as a metaphor for the omnipotence of Yahweh? Did the celestial design hold some type of astronomical knowledge? Was it a teaching device? The significance of the Zodiac and its function in these ancient Jewish rituals is intriguing, although beyond the scope of this study. But the format, style and design of the zodiacal scenes is an integral piece of the puzzle when following the transmittal of astronomical iconography. Although the Jewish synagogue mosaics were in all likelihood not a direct source of images for the illustrators of the *Aratea* manuscripts, the designers of the imagery for both types of artworks must have been influenced by pre-existing exemplars and drew from the same accepted astronomical and mythological traditions prevalent in the Greco-Roman world.

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[173] Kühnel 36

2.6 ZODIACAL MOSAICS IN EARLY CHRISTIANITY

Zodiacal imagery seems to have had only an incidental role in Early Christian art. Historian Steven Fine concludes that this subject matter was >deliberately excluded=.[174] It is possible that because the Zodiac was so closely associated with Jewish synagogues, the Christians in the East consciously chose not to include it as part of their iconographic programs. With few exceptions, the earliest surviving zodiacal representations in Christian art date to the ninth century, and were modeled on the early astronomical and astrological manuscripts that were being copied in the Carolingian court schools. One Christian mosaic from the sixth century appears somewhat similar to the synagogue zodiacal diagrams and this lone example emphasizes the Christian reluctance in respect to this subject.[175] This floor mosaic from the Monastery of the Lady Mary in Bet She=an shows a twelve-part zodiacal circle filled with large human images representing the months. The twelve standing males are each attired in Roman casual garb with attributes that refer more to the Labors of the Month with no direct indication of any familiar constellations of the zodiac. Although male worker of September holds a shaft of wheat, always ascribed to Virgo, and April=s figure holds a sheep. Interestingly May, the month of Gemini, has one young man holding a lyre, the iconography of Amphion, rather than Castor or Pollux. In the central circle of this mosaic are busts of a feminine-like Helios, eyes looking heavenward and crowned with rays and holding a huge torch, and a serene Selene with

[174] Fine 199
[175] Kühnel 43

a cresent moon crown, holding a scepter.[176] No trace of their chariots can be detected. The lack of zodiacal imagery in the Early Christian art and architecture is in direct contrast to the Middle Ages when the Zodiac readily appears in carved tympanum, stained glass windows, tapestries and of course, manuscripts. A significant exception to this general statement is the mosaic image of Christ discovered in Rome.

Christ as Helios

The iconographic image of Helios steering his chariot through the heavens with four powerful horses was borrowed by the Early Christian artists for one of the earliest depictions of Christ. Excavations beneath Saint Peter=s Basilica in Rome have revealed an evidential mosaic in the vault of Mausoleum M of the Julii in the Vatican Grottoes which dates to the third century, now called *Christ as Helios*.[177] Helios, the pagan Sun God, has become Jesus Christ, the Christian Son of God. The partially-damaged figure is set within a golden background and surrounded by curling vines with lacy leaves, instead of the expected Signs of the Zodiac. Just one wheel of the chariot remains, and two white horses face toward the center of the image, the damaged area may have held the other two horses. Christ is rendered as blond, youthful and beardless, dressed in a striped garment with a cape blown by the wind. Around his head is a glowing aura emiting rays of light that form a cross that extends from the halo rather than within the halo, which later becomes the standard crossed nimbus. Like images of Mithras, Christ=s eyes are directed skyward, not toward the viewer; his left hand holds the globe, a

[176] Has the Sun-God taken on the appearance of Mary, in a monastery dedicated to her?

[177] In Synder=s *Medieval Art*, this mosaic is pictured and briefly discussed on page 25, first edition, and page 6 in the second edition.

symbol of his power and protection that continues through the Middle Ages.[178] The dazzling Sun-God icon has had a pervasive life history; developed as the ideal male form in the Greek world, taken over by the Romans, adopted and adapted to conform to the Jewish religious culture, and then embraced by Early Christian artists as one of the patterns for the portrayal of Christ. Astronomical images in artwork do not survive in abundance until the Carolingian renaissance of the ninth century, but there are examples to explore in scroll and codex illustrations.

2.7 LATE ANTIQUE SCROLL ILLUSTRATION

Papyrus scrolls decorated with illustrations have been discovered in tombs and in sargcophagi dating as far back as Old Kingdom Egypt, 3000 BCE; but most of these ancient heirgylphic writings are verses, spells and incantations from the *Book of the Dead*. Although the Egyptians practiced astronomy and astrology, the representations of the familiar constellations seem to date to classical Greece and are not derived directly from Egyptian sources. Ancient Babylonian relief sculpture and cuneiform tablets often include astronomical imagery and the Signs of the Zodiac, but the picture cycle of the entire forty-four or forty-eight constellations on which this study focuses, as far as presently known, do not appear until Hellenistic times. Survival of manuscripts from the late antique period is quite rare, only a small number are

[178] This portrayal of Christ has a strong resemblance to some images of Mithras, especially the eyes.

extant, some Biblical and some literary. Therefore the history of the *Aratea* manuscripts prior to the ninth century cannot be written, and the question of exactly when the poem was first decorated with pictures cannot be answered. The earliest-dated papyrus fragments of the *Phaenomena* are in Greek and are not illustrated; no scrolls of the *Aratea* exist from time of the Roman Empire. But other papyrus fragments from this early time period demonstrate that the text of scrolls was often decorated with pictures. According to Kurt Weitzmann, there was a vast tradition of book illumination in classical times, it was said the Library of Alexandria had 700,000 scrolls, many of these would have included pictures.[179]

We can assume that many natural science texts were illustrated, a surviving example is the precise, realistically-painted Vienna Dioscurides which discusses the medicinal and healing power of plants. Pliny writes (N.H. XXV.IV.8) that the herbals of Crateuas, Dionysius and Metrodorus were Amost attractively@ illustrated with the plants and herbs that were discussed.[180] In fact, one of the earliest extant papyrus rolls in Greek is adorned with astronomical images. The papyrus scroll two meters in length, containing an astronomical treatise, is held by the Louvre. The text columns of this roll are explained with diagrams and pictures of the constellations; the scarab representing the Sun, Osiris for Orion, the Claws for Libra, and the Scorpion are inserted where appropriate. These simplified sketches with no background material or defining frame are positioned between the columns of text, Weitzmann coins the term >papyrus style= illustrations for these >scaled-down= images.[181] He demonstrates that these

[179] Weitzmann 9
[180] Weitzmann 9
[181] The Utrecht Psalter is a perfect example of this >papyrus style=.

papyrus style pictures continued as models for centuries, even after more advanced modes of illustrating had appeared.[182] In his study of the development of illustrations from the papyrus scroll to the parchment codex, Weitzmann uses representations found in astronomical texts, especially the *Aratea* manuscripts, to exemplify his discussion, although he is often incorrect in his identifications.[183] He selected astronomical treatises since that is the earliest topic in Greek papyrus scrolls to be illustrated, and in addition, astronomical imagery was available for his study in great number of medieval manucripts.

Astronomical Imagery in Codex Illustrations

By the end of the fourth century, the transference of classical and Christian literature from the papyrus scroll to a parchment codex format was basically accomplished.[184] This transition from papyrus to parchment changed the art of illustration more dramatically than it modified the art of writing. Radical changes took place when the pictures began to be separated from the text and eventually enlarged to fill the entire folio, a much more receptive medium for paint than the fragile papyrus. No longer crammed into tiny spaces between columns of text, miniature painting could become expansive and varied, borrowing from the art of frescoes,

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[182] Weitzmann writes, AA manuscript in Munich (Staats, cod. 210) written in the year 818 in Salzburg shows exactly the same principle of illustration, except that the simple diagrams with partly Egyptian symbols were replaced by images essentially based on Greek mythology, images which surely were not invented for the *Phaenomena* of Aratus-although this whole group of texts is know as *Aratea*-but most likely for the *Katasterismoi* ascribed to Eratosthenes of Cyrene.@ He does not say so exactly, but he implies that this manuscript is an *Aratea*; it actually contains the writings of Hyginus! He also writes that the accompanying verses in the Leiden manuscript are taken from Avienus, when in fact the verses are mainly those of Germanicus with small sections of Avienus added.

[183] Weitzmann (1971) 96 Both Virgil manuscripts contain his *Georgics* which are also illustrated with seasonal occupations and animal lore.

[184] Pächt 15 This transition was selective, only selected works worthy of preservation survived the conversion. Fortunately, the *Phaenomena* was one of the survivals of this process.

panels or mosaics, in addition to the sketchy illustrations decorating brittle scrolls. Yet only a relatively small number of texts were illustrated or decorated in any way until the medieval period.[185] The diversity of types and styles of images seen in the ninth-century *Aratea* manuscripts indicate that there must have been a variety of source material for astronomical imagery, possibly from the various astronomical traditions. Astronomical texts seem to have invited illustrations and diagrams in Late Antiquity and possibly even earlier.

Among the earliest extant illustrated manuscripts are samples of epic poetry, one of the most admired topics after religious codices. The epic poems of Homer, the *Iliad* and the *Odyssey*, were extremely popular subjects, fifty-eight miniatures cut from an *Iliad* manuscript survive in Milan; the *Aeneid* of Virgil is close to Homer in survival numbers.[186] (The early spelling of Virgil used an E, while the modern spelling prefers an I; thus the two different versions.) The plays of Terence were illustrated in Late Antiquity as well, and they were also copied by the Carolingians.[187] Two illustrated manuscripts of the *Aeneid* are in the Vatican Library; the *Vergilius Vaticanus* which dates to the early fifth century, and the *Vergilius Romanus*, the later fifth century.[188] Like the early *Aratea* manuscripts, the two Virgil manuscripts are totally different in size, style and iconography, and in spite of their divergence, it is now thought that they were

[185] Pächt 33 He finds it quite extraordinary that Ovid=s *Metamorphoses* inspired no pictorial representations until the Renaissance.
[186] Weitzmann (1977) 13
[187] Walker 48
[188] Walker 62 He dates the Roman Vergil to around the 480's. He corrects the former notion that it was produced in the provinces, perhaps Ravenna. Rome is the only possible conclusion for the production of a manuscript of the >superlatively high quality= of the parchment and calligraphy. No other center had the capability to create top-calibre book production, Ravenna was still a >backwater= at that time. See also David H. Wright, *The Roman Vergil and the Origins of Medieval Book Designs*, University of Toronto Press, 2001 and Marco Buonocore, *Vedere i Classici*: L=illustrazione libraria dei testi antichi dall=erà romana al tardo medioevo, Biblioteca Apostolica Vaticana, Fratelli Palombi Editori, 1996

both produced in Rome.[189] The >Roman Vergil= is enormous with 410 folios, and abundantly illustrated with large-scale miniatures.[190] The illusionistic miniatures in both the >Roman Vergil= and the >Vatican Vergil= are frequently set apart from the text by bright red frames, a feature which reappears in the Leiden *Aratea*. The oldest surviving pictures in painted frames can be dated without exception to the fourth century CE.[191] The artistic approaches and iconography seen in the Virgil manuscripts are a consideration in the study of *Aratea* manuscripts.

Another artistic technique surviving from classical sources was included in one ninth-century *Aratea* manuscript and several later versions; this imaginative design can be traced to early Greek poetry in which the text was manipulated to form representations of physical objects called *calligrams*. This original but curious literary device, known as *technopaignion* or >art games=, was created by Greek scribes wherein the tightly-written verses of the poem actually create an image of the animal or human figure they are describing. Nordenfalk notes that Constantine=s court poet, Publilius Optatianus Porfyrius, spoke of ornate editions of his *carmina figurata* which had been painted with contour lines, and he then wrote them *picto limite dicta notans,* fitting the written text within outlines indicated by the brush.[192] This pictorial device of the ancient Greeks has been revived in the creative drawings of the constellations in

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[189] Walker 5 As evidence for Rome=s capability to still produce outstanding artworks even in its decline, Walker presents examples of outstanding carved ivories created at that same time period.

[190] Walker 5 He calls it the Amost impressive example we have of Roman book illumination at the moment of transition from classical to medieval practices@.

[191] Nordenfalk 7 AThe first efflorescence of the art of illumination took place about the time when the culture of classical antiquity was beginning to decline.@

[192] Nordenfalk 10

Cicero=s *Aratea*, British Library MS Harley 647, which became the prototype, and was repeated a few times through the Middle Ages.

As demonstrated, illustrations in ninth-century codices were not created in a vacuum, but drew on the enormous variety of traditional art communicated through scrolls, wall paintings, model books, and other artistic media. An ivory diptych showing the Apotheosis of an Emperor, dated to the mid-fifth century, gives prominent position to Helios and his four horses and to the band of the Zodiac bordering the heavens. The astronomical picture cycles that appear in *Aratea* manuscripts were adapted for the codex format from archetypal images of the constellations already prevalent in the classical world. Mythological figures, such as Herakles, Perseus, Andromeda, and Castor and Pollux, had already become instantly recognizable through their specific iconography transmitted from ancient art, especially Greek vase paintings, and Roman relief carvings, statuary, frescos, mosaics, globes, metalwork and coinage treasured by nobles and ecclesiastics.

Manuscripts of the *Aratea* which survive from the ninth century differ greatly from each other in their arrangement and style; therefore artists must have had a variety of choices from which to procure their mythological imagery. In addition to the fore-mentioned artistic sources, textual models for early astronomical imagery could most probably be found in the works of other astronomical writers as well, in particular, Pliny the Elder, Hyginus, Martianus Cappella and Macrobius. Their treatises survive in later copies that definitely are illustrated; and as in the case of the *Aratea*, it is not known for certain if they were illustrated originally, or at what point pictures were first added to these astronomical writings. It is a curious fact that Christian

patrons and scribes took advantage of the new book form, but one of the manuscripts chosen to be copied and illuminated by the Christian patrons was an astronomical poem honoring the pagan gods and pagan philosophical concepts that conflicted greatly with accepted Christian dogma. Recognizing this exceptional status gives further credit to the esteem with which the ancient writing of Aratus was held, as the poem from the classical culture was readily accepted into the Christian culture. For more than two thousand years, the *Phaenomena*, in its Latin versions, has been continuously enjoyed by interested readers, and analyzed by experts. The illustrations of the *Aratea* have been admired since at least the ninth-century when produced by the Carolingian artists.

This section of the inquiry has examined some of the many possible sources for the astronomical imagery found in *Aratea* manuscripts. In particular, common exemplars for astronomical imagery may have been: calendars (*Codex-Calendar of 354*), celestial globes (Farnese Atlas), the cult of Mithras (the tauroctony), zodiacal mosaics (Jewish synagogues), and Late Antique illustrated codices. In order to better understand the role of the text and images of the *Aratea* in medieval society, Chapter 3 will investigate the manuscripts traditions of the other principal authors that were responsible for transmitting >popular= astronomical knowledge in the Middle Ages.

3.0 ILLUSTRATED MANUSCRIPT TRADITIONS RECOGNIZED FOR THE TRANSMISSION OF ASTRONOMICAL KNOWLEDGE

This chapter investigates the principal sources, other than the *Aratea*, for the transmission of astronomical information in the Latin West through the Middle Ages. Most of these widely-read astronomical treatises were illustrated with cosmological diagrams and many contained the full cycle of constellation pictures. This section examines the writings of key authors individually in order to distinguish their various works from the *Aratea*, differentiating the other well-known astronomical traditions, in order to determine which authors are likely to include the constellation cycle and which would not be illustrated. Some of the most important early sources of astronomical information influential in the Middle Ages that will be discussed are: Pliny the Elder, Hyginus, Martianus Capella, Macrobius, Isidore of Seville and Bede. The *Aratea* is frequently found in miscellanies, anthologies and compilations; in many instances it was bound together in the same manuscript with astronomical writings of these other popular authors.[193] At times these other astronomical texts have been misidentified as the astronomical writings of the *Aratea*, when they actually come from a completely different source. This

[193] For example, Madrid BN Codex de Metz 3307 (c.840) holds a Germanicus and Hyginus; and St. Gall, Stiftsbibliothek, Codex 250 has a Cicero bound with Bede's *De temporum ratione* and *De temporibus* and Hyginus.

section presents an overview of the ‘scientific’ segments of other important illuminated manuscripts, such as the twelfth-century encyclopedia of Lambert of St-Omer, *Liber Floridus*, investigating especially the astronomical text, and how it relates to the illustrations. By explaining and comparing the text attributed to each author, and defining the picture cycle that accompanies each, a better understanding of the various manuscript traditions can be obtained. It is hoped that this classification and clarification will be helpful for art historians in order to identify the sources of astronomical segments found in manuscripts more easily and more accurately.

3.1 AUTHORS OF ASTRONOMICAL TEXTS - FIRST TO TWELFTH CENTURY

When investigating the transmission of astronomical knowledge, art historians and historians of science are limited unfortunately to those texts that have survived; what has perished may have provided a deeper understanding of the discipline of astronomy. Even then texts are silent as to how they were understood, how they were used in teaching, how they were disseminated and what part oral transmission played in passing on scientific information. In earlier times much more had to be committed to memory, since learners were without the vast amount of data we are fortunate to have readily available in modern times. In this study, the art of memory is a small but not inconsequential component that must be considered in the

transmission of technical knowledge, as the Zodiac was often used as a mnemonic tool.[194] Illustrations are an instrumental aid in the retention of accurate details, and beyond their aesthetic value, perform an invaluable mnemonic function.

In the history of science, including astronomy, researchers tend to refer to the later part of the Middle Ages neglecting the early medieval scientific writings, most probably because these early treatises tend to mix science with Scripture and theology. But current scholarship is becoming aware of the fact that to leave Christian writers such as "Isidore, Bede or Alcuin out of accounts means denying the history of science the main channels of transmission of ancient cosmological knowledge and concepts to the late Middle Ages and the modern world."[195] In order to more fully understand the position and role of the *Aratea* in the transmission of astronomical knowledge during the medieval period, it is necessary to distinguish the type of knowledge contained in the poem, and examine how it was received, compared with other principal sources. The following is a brief investigation of the most important authors of astronomical material from Rome, Late Antiquity, and the early Middle Ages and a discussion of the diverse ways that astronomical knowledge has been transmitted in their treatises through a huge variety of formulas; poetic, mythological, allegorical and artistic.

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[194] See Francis Yates, *The Art of Memory*; Mary Carruthers, *The Book of Memory*; and Carruthers and Ziolkowski, *The Medieval Craft of Memory*.

[195] Kühnel 14

3.1.1 Astronomical Texts of Ptolemy

By far the most important astronomer until the time of Brahe, Galileo, and Kepler, was Ptolemy of Alexandria (second century CE), but his writings are actually not a direct factor in the transmission of scientific knowledge until the late twelfth century. Although revered in the Latin West as a scholar of antiquity, he was little more than an ancient name during most of the Middle Ages, sometimes even mistaken for a Ptolemaic king of Egypt. His principal astronomical works are; the *Almagest*, known by its Arabic title, which was chiefly concerned with geometrical models and mathematical astronomy; and the *Tetrabiblos*, his four-book treatise on the art of astrology. The writings of Ptolemy were lost to the Latin West in Late Antiquity, and only recovered much later when translated by Latin and Jewish scholars from Arabic libraries in the twelfth century, chiefly in Spain and Sicily. In his scientific writings, Ptolemy was not interested in the poetry and myths of the constellations of the heavens, but was entirely concerned with the harmonious movements of the stars, the complicated spheres and epicycles of the planets, theoretical laws, and mathematical aspects of astronomy, introducing what is now called spherical trigonometry. Ptolemy's treatises were not usually illustrated since his writings were concerned with relative motions and descriptions of the stars' intrinsic qualities, not their mythological characteristics. They were sometimes accompanied with complex geometrical diagrams that helped explain his cosmological concepts; but these are quite different from the colorful and easily-understood diagramatic rotae attributed to Macrobius or Isidore of Seville. Most of these diagrams were derived ultimately from Pliny the Elder. The type of astronomical knowledge contained in most of these manuscripts is

considered ‘popular’ astronomy rather than the sophisticated technical and theoretical astronomy of Ptolemy.

3.1.2 Manuscripts of Pliny the Elder

Most astronomical information that was available in the early Middle Ages was derived from Roman rather than Greek sources. Although not as well known for his astronomical writings as for his works on architecture, Vitruvius (1st century BCE) discusses the subject in his *Ten Books on Architecture*, where he writes about the constellations, planets, phases of the moon and astrology. But a much more important Roman source was Pliny the Elder (CE 23/79) in his *Naturalis Historia*, but the number of medieval scholars who knew Pliny firsthand was very small.[196] Pliny’s *Natural History* itself is not an original creation, most of his material was gathered from earlier writers; yet his work is a storehouse of facts.[197] His *Natural History* is quite broad in scope, an encyclopedia in thirty-seven books; and the astronomical material was not treated as a separate subject, but discussed in different sections throughout the book.

In the first part of Book Two, Pliny discusses cosmology and the motions of the sun, moon, planets and stars plus some technical aspects, such as the ecliptic, eclipses, and the sphericity of the earth.[198] He also distinguishes between stars and planets and gives the periods of their cycles and estimates of their distances from earth. In Book Six, he discusses

[196] Laistner 37 Pliny’s writings were quoted and commented upon secondhand by numerous other authors.
[197] Lindberg 141 In the preface to *Natural History*, Pliny tells that he and his assistants searched 2000 volumes by 100 different authors and drew 20,000 facts from them. He then produced a ‘storehouse of interesting and entertaining information’.
[198] McCluskey (1998) 16

geographical issues, the size and shape of the earth, the concept of latitude and the changing length of the day. While most of Book Eighteen is devoted to a general discussion of time, the calendar, an explanation of practical astronomy, and related meteorological considerations.[199] In a macro/microcosmic scheme, Pliny associates the motions of the heavens in relationship to human needs, following the direction of Hesiod, Aratus and Virgil, but he provides more specific scientific details.

Large sections of Pliny survive from the eighth and ninth centuries in six manucripts[200], but there is no indication whether these were illustrated, but some do contain diagrams. Research has shown that the *Natural History* of Pliny was known and consulted by medieval scholars such as Alcuin, Helperic, and Lupus of Ferrières at the premier centers of learning at Aachen and Auxerre. Pliny is cited in letters that survive between Charlemagne and Alcuin, and his work is mentioned again when listed in the contents of the library of Louis the Pious.[201] These facts, plus the large number of surviving manuscripts and diagrams attributed to Pliny, demonstrate that he was 'one of the strongest influences on Carolingian planetary theory'.[202] In the twelfth century, excerpts and a diagram of Pliny's astronomy appear in the great

[199] McCluskey (1993) 162 He states that the astronomy related by Pliny is 'stellar'. Although Pliny knew that features of astronomy varied from place to place because of the sphericity of the earth, he refrains from introducing mathematical concepts.
[200] Eastwood (1993) 162 Only one manuscript, definitely dated to the ninth century, contains the complete text of Pliny (Paris BNF lat. 6795). A manuscript dating to the first half of the ninth century, possibly from Lorsch, is held by the Morgan Library (MS. M.871); it has about one-half of Pliny, but ends before Book 18. An eighth-century manuscript of Pliny at Leiden (UB MS. Voss. F.4) survives in part, beginning after the astronomical section of Book Two. A fourth manuscript of Pliny's work is incomplete and has been divided into two different collections (Vat. Lat. 3861 and Leiden Voss. F.61), made in northern France about 800. Another Leiden manuscript (UB MS. Voss. Lat. Q.69) preserves the fifth Pliny segment having only excerpts, about seventy from the early books, including the important Book Two. The sixth Pliny is a Corbie manuscript dating from the early ninth century (Paris lat. 6796).
[201] McCluskey (1993) 163
[202] McCluskey (1993) 168

encyclopedic compilation, *Hortus Deliciarum* of Herrad of Hohenbourg.[203]

3.1.3 Manuscripts of Marcus Manilius

Another Roman poet who owes much to the writings of Aratus and the *Aratea* is Marcus Manilius,[204] author of *Astronomica*, a didactic astrological poem composed during the final years of Augustus' rule and the early reign of Tiberius (CE 9-15)[205]. Although a contemporary of Tiberius and Germanicus, the exact dates of the birth and death of Manilius are unknown, in fact little is known about his life beyond his extant work.[206] What survives of *Astronomica*, a massive Stoic poem, is contained in five books, written in hexameter verse.[207] Today it may seem unusual that Manilius would compose an instructional book of astrological theory in poetic form; but poetry was the customary format of most philosophical treatises at that time. Manilius lived in the same cultural surroundings as Cicero and Germanicus, who wrote not for the commoners, but for the intellectuals and elite of Roman society, among whom verse was the accepted didactic milieu.[208] Manilius and other authors of technical material were admired for their ability to put such complicated, conceptual subject matter into verse, which was what

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[203] Eastwood (1990) see "The Diagram *Spera Celestis* in the *Hortus deliciarum*: A Confused Amalgam from the Astronomies of Pliny and Martianus Capella". The diagram appears on p. 93, plate 5, Rosalie Green et al, *Hortus Deliciarum/ Herrad of Hohenbourg*, Warburg Institute, 1979.

[204] Manilius image is taken from Dürer's celestial map of 1515.

[205] Garrod lxi From references in his poem, it can be fairly certain that Manilius survived Augustus at least by a few years.

[206] Garrod lxi Manilius seems to have a high regard for the Sign of Gemini, "he tells that under Gemini are *born poets and astrologers"*. Perhaps he himself was a Gemini.

[207] Tester 30 Even his name has been questioned, prompting discussion and debate among scholars, but Manilius is accepted by most historians today.

Tester 30 Another classic example of didactic poetry from an earlier date is the *De rerum natura* of Lucretius, which Manilius often imitated

ultimately attracted so many readers.[209]

The astronomical material in Book I of the *Astronomica* was derived from the informative Latin verses of the *Aratea*, since it was thought to be the only text on astronomy that had been translated into Latin at that time.[210] Found in Manilius' first book is an introduction to elementary astronomical principles, the *sphaera*, the basic description of the heavens, including the circles of the tropics and equator, the horizon, meridian and Milky Way. The verses also praise the order and reliability of the movements of the heavenly bodies and concludes with a lengthy discourse on comets, particularly their significance as omens of future events, furnishing examples from the past. The popular astronomy in Book I is relatively easy to follow, students of Latin poetry could understand the basic theories.[211] For instance, Manilius wrote in twelve lines of verse a description of the twelve Signs of the Zodiac, perhaps to be memorized as a mnemonic exercise.

> First Aries shining in his golden fleece
> Wonders to see the back of Taurus rise,
> Taurus who call, with lowered head, the Twins,
> Whom Cancer follows; Leo follows him,
> Then Virgo; Libra next, day equalling night,
> Draws on the Scorpion with its blazing star,
> Whose tail the Half-horse aims at with his bow,
> Ever about to loose his arrow swift.
> Then comes the narrow curve of Capricorn,
> And after him Aquarius pours from his urn
> Waters the following Fishes greedily use,
> Which Aries touches, last of all the signs.[212] (263-274)

Although it is thought that Manilius drew his astronomical material from the *Aratea*,

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[209] Tester 30

[210] As mentioned in Chapter 1, many Roman authors had translated the Greek poem of Aratus. Ptolemy did not write his authoritative astronomical treatises until the second century CE, which continued as the 'bible' of astronomy until early modern times .

[211] See *M. Manilii Astronomica*, ed. and trans. George P. Gould, Stutgardiae: Teubner, 1998.

212 Tester 31 "..the position of the zodiac itself is not described until 400 lines later." Tester translation.

which ultimately derived from the *Phaenomena*,[213] his astrology was adapted from another source, most probably Hellenistic and Egyptian.[214] Aratus' poem contains no astrology, as expected, since the 'science of astrology' was still in its formative stage when Aratus was actively writing, but the *Weather Signs* at the end of the poem brim with accounts of animals' behavior and natural phenomena that act as signs and indicators of future natural events. Manilius also adopts the Stoic philosophy presented by Aratus when he recognizes the 'all-controlling Reason' for keeping the heavens moving and the constellations following their appointed courses. When examining the history of most cultures before the modern era, astronomy was studied chiefly for astrological purposes. The second Book of *Astronomica* is the longest and most complicated of the five, for the astronomical material becomes much more difficult and daunting for the reader. Manilius' versification of the scientific terminology concerning triangles, quadrangles, hexagons, and dodecatemories formed by the planets and the Signs of the Zodiac becomes incomprehensible, 'a poetic nightmare'.[215]

The other books of the *Astronomica* pertain mainly to astrology and its numerous aspects, drawing on sources now lost. Manilius uses astrology to link the heavenly and divine macrocosm with the earthly and human microcosm, affirming the ancient proverb, "As above,

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213 Though not mentioning him by name, Manilius refers to Aratus when he says, "there are certain of the poets who have described to us the diverse configuration of the stars, and have assigned to their proper class and cause all the constellations that glide at large in the spreading heaven". II 22-26 Garrod 3

214 Tester 31

215 Garrod vi "we have yet to learn how to deal with a poet who versifies the multiplication tables and sets to the measure of Vergil the reasonings of Euclid". Book II also discusses the twelve Signs of the Zodiac defining their various relationships; the hostility of oppositions, aspects of Signs that are squares, triangles and conjunctions. At the start of Book II, Manilius invokes the memory of Homer and Hesiod, speaking of the historical, mythological and astronomical references found in their poetry.

so below". At this time astrology had taken a strong hold on Roman society, as religion, literature, and popular thought at this time were thoroughly infiltrated with astrological doctrine.[216] The principles of astrology advocated by Manilius were not based on superstition or personal advancement, but on the oneness of a divine intelligence that pervades all the phenomena of nature. 'God hath descended into man, and in man's seeking of him seeks himself'.[217] Like Aratus, Manilius expresses his astrological/philosophical ideas in compelling poetic form.

> For I will sing of the silent strong workings of nature,
> and of god interfused in earth and sky and sea
> controlling in impartial covenant the mighty mass of things.
> I will sing of how the whole universe is alive with harmony
> upon this side and that, and is moved by the motions of Reason,
> one spirit indwelling in all its parts,
> shedding its dews upon the round world,
> swiftly speeding through all things,
> and fashioning the body of things to breathing life.[218]

Because Manilius refers to other astrological material in his books that cannot be found there, it is assumed that large portions of his writings have been lost. According to Reeve, the text of Manilius depends primarily on three manuscripts.[219] Twenty-two manuscripts of *Astronomica* are still extant.[220] Text scholars do not mention whether any of these manuscripts

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[216] Garrod lxvii He writes, when reading the work of an astrologer, "we looked for a quack or an imbecile", but "the most striking impressions that we receive from the reading of the *Astronomica* are undoubtedly those of a rare purity of mind in its author and a singular freedom from superstition. ... Manilius is the peer of Lucretius".

[217] Manilius II. 108, Garrod lxxi

[218] Manilius II. 60-7, Garrod lxxi

[219] Reeve, M.D. "Manilius" in *Texts and Transmissions*, ed. L.D. Reynolds, 235-38 In his more recent text analysis, Reeve states that the three prime manuscripts are Leipzig 1465, Brussels 10012, and Madrid 3678. He recommends Garrod edition and the excellent Loeb edition of G. P. Goold, 1977.

[220] Garrod xv The twenty-two mss. have been grouped into three families: the Belgian (six), Italian (six), and Hungarian (ten). The three most important are two from the Belgian family and one Italian manuscript from

are illustrated with pictures or diagrams. The poem concentrates only on the constellations of the Zodiac, the numerous other constellations of the night sky are not a part of his astrological doctrines; and they are not mentioned. Therefore the inclusion of a pictorial cycle in *Astronomica*, often found in other astronomical treatises, should not be expected. Although not found in Manilius, wonderful illustrations of the constellations are found in astronomical manuscripts of Roman author, Hyginus.

3.1.4 Illustrated Manuscripts of Hyginus

Another contemporary of Germanicus is the writer and poet, Gaius Julius Hyginus (64 BCE -CE17), a native of Spain or perhaps Alexandria, and a freedman of Caesar Augustus, by whom he was made superintendent of the Palatine library.[221] Hyginus was a voluminous author, and his works include topographical and biological treatises, on such varied topics as bee-keeping, and commentaries on Helvius Cinna and the poems of Virgil; all of which are lost. With the avid interest in celestial imagery, apotheosis, astronomy and astrology in Roman society, it is not surprising that Hyginus too produced an astronomical handbook called *Poetica astronomica* or *De astronomia*. This writing and his other surviving prose work, *Fabulae*,

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which the other five derive; all six are from the fifteenth century. The earliest is Brussels, MS.10012 dating to the eleventh century, all but four of the surviving manuscripts date to the fifteenth century. Scholars also know from early references of four lost manuscripts of *Astronomica*.

[221] Suetonius, *De grammaticis*, 20 It has not been firmly established that the man Suetonius describes is Hyginus the author.

provided a compilation of Greek and Hellenistic mythology and astronomical lore.[222] His *De astronomia* comprises an elementary treatise on astronomy, but it is not an original work, as most of its mythological content is simply translated from Ps-Eratosthene's *Catasterisms*. The treatise is divided into four parts plus an introduction; in Book I are general definitions of the sphere, the Zodiac and the Earth. Book II deals with legends of the stars, and in Book III, Hyginus names and illustrates forty-two constellations, indicating the number of stars in each group. Book IV describes the circles of the sphere, day and night, the Signs of the Zodiac and planets. His work provides some technical data, but he concentrates more on relating the myths and stories, chiefly based on the work of Eratosthenes. Look to Book III for the illuminations.

Since the astronomical handbook of Hyginus is often found bound with, integrated with, and sometimes mistaken for, *Aratea* manuscripts, its illustrations are integral to this study. In fact the text of *De astronomia* is easily recognized since it gives the positions and number of stars in each constellation, which are never mentioned in the *Aratea*. Scholia on Cicero's version of Aratus derive from a text of Hyginus.[223] Hyginus' writings appealed to the courts of the Carolingian rulers since the earliest manuscripts of *De astronomia* date to that pivotal period. At least eleven copies of Hyginus' work survive from the ninth century. Like the *Aratea*, numerous manuscripts of *De astronomia* also survive from the fifteenth century. Hyginus became a favorite with Humanists and booklovers, possibly because his work made the pure classical tradition of astronomical knowledge accessible without reference to Arabic or

[222] The *Fabulae* includes about 300 very brief and simply written mythological legends and celestial genealogies. Presented in primitive form, the myths included in the *Fabulae* taught basically the details that every educated Roman in the early Empire desired to know about Greek myth.

[223] Reeve, M.D. "Hyginus" in Texts and Transmission, ed. L.D. Reynolds 189

medieval intermediaries. At that time, astrology had reached the apex of its intellectual position and influence, attracting many noble and wealthy patrons who sought to commission books that featured elegant drawings with cosmological themes. Appealing to their refined tastes, the readers at wealthy Renaissance courts also enjoyed the work of Hyginus for its Classical allusions, impressive illustrations, and mythic stories of ancient Greece combined with astronomical 'science'.[224] A listing of some extant Hyginus illustrated manuscripts is included in Appendix A.

New York Public Library, Spencer Collection MS 28

A small but exquiste manuscript of Hyginus' *De astronomia*, held by the New York Public Library, was recently displayed in an exhibition there, entitled *The Splendor of the Word*.[225] The Latin treatise on eighty folios is decorated with thirty-eight illustrations of the constellations drawn on paper by two or perhaps three different artists.[226] The miniatures for the most part are attributed to Giovanni Vendramin and demonstrate that it was connected with Padua in the 1470's[227], while the script has been recognized as that of Francesco Buzzacarini. Three of the constellation illuminations are attributed to another artist, the Douce Master, who also painted a

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224 Saxl and Meier 1953, vol. III, I, liii, 328, 439 and Wormald and Giles, A Descriptive Catalogue of the Additions in the Fitzwilliam Museum, Cambridge, 1982, 192-94. At least two copies of De astronomia were associated with the court of the Gonzaga in Mantua: 1. Fitzwilliam Museum MS 260, c. 1475 and 2. formerly Dyson Perrins MS 92

225 The catalog, *The Splendor of the Word*, was written by J.J.G. Alexander, James H. Marrow, and Lucy F. Sandler, Harvey Miller Publishers (2005), with contributions by other authors. The exhibition was October 2005 to February 2006.The article discussing the Hyginus manuscript was written by Giordana M. Canova. See also DeRicci, II, p. 1341, no. 28 and J.J.G. Alexander, *The Painted Page*, 120

226 Alexander *(Painted Page)* 120 Alexander asserts that there are 5 different illustrators in this manuscript.

227 Padua was one of the main centers for the study of astrology in all Europe and with Florence one of the main centers of humanism.

breviary written in 1473.[228] The second illuminator painted in a similar manner as the first, imitating his technique, so there would be no dissonance when viewing the manuscript. The miniatures are placed between sections of text, some are framed with a red tasseled cord and in others, the illustrations reach into the text. The drawings show the characteristic, quasi-antique influence common in the Italian Renaissance.

The numerous illustrated manuscripts of Hyginus are mostly neglected in art historical literature, they have not been studied either individually nor as a manuscript tradition. Text scholar Reeve declares, "Has any classical text been so ill served by recent scholarship as this?".[229] The Hyginus manuscripts often contain the full cycle of constellation pictures, most that I have seen are of high quality. During the first and second centuries, large numbers of astrological treatises were written and circulated within intellectural circles. These were accompanied by astrological charts or horoscopes, but not decorated with pictures. After the burst of activity among astronomical writers in the first century, there are no outstanding authors whose astronomical works were illustrated until Martianus Capella and Macrobius in the fifth century. If there were any others, they were not readily copied, nor did they circulate in the Latin West.

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[228] Canova 339 in *The Splendor of the Word.*
[229] Reeve, M.D. "Hyginus" in *Texts and Transmission*, ed. L.D. Reynolds 187

3.1.5 Illustrated Manuscripts of Martianus Capella

During the Middle Ages, in addition to Pliny the Elder and the *Aratea*, the three major authorities mined for astronomical information were Boethius (ca. 480-524)[230], Martianus Capella (fl.ca. 410-439) and Macrobius (ca. 360-422). When comparing the writing style of these three Late Antique authors to the verse format preferred by Aratus, the *Aratea* authors, and Manilius, poetry is no longer the desired technique. Instead all three Latin writers discuss their astronomical material, not in a technical treatise, but rather in an allegorical form. Their respective works, *The Consolation of Philosophy*, *De nuptiis mercurii et philologiae*, and *Commentum in somnium Scipionis*, intersperse their 'scientific' information with an entertaining narrative, perhaps as a mnemonic devise to assist the reader in retaining the more technical aspects.[231] The allegorical stories of these three authors related their cosmological viewpoints which had mainly been derived from the works of Plato and the Neoplatonists. Plato's *Timaeus* was the only original Greek philosophical work available in the early Middle Ages. The works of all three authors were widely read throughout the Middle Ages, but they were designed for advanced students and educated layman, and did not contain challenging mathematical astronomy.[232]

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[230] Boethius was an important writer in the early 6th century, both a Christian and a Roman patriot. His *Arithmetic* was almost the only source of arithmetical knowledge for the early Middle Ages.

231 McCluskey 122-23 Boethius wrote his greatest work, the Consolation, while in prison awaiting his fate on the charge of conspiracy for which he was executed in 524. Lady Philosophy appears and reminds him that earthly fame and suffering are insigficant compared to the vastness of the cosmos. His writings have Christian overtones, but since they were not illustrated, they are not part of this study.

232 Tester 115 Another Roman author of astronomical data was Calcidius, a late fourth-century astronomer, although his influence was slight, since his writings were almost unknown until the twelfth century .

Martianus Capella is thought to have composed *The Marriage of Mercury and Philology* in his old age, probably the first third of the fifth century;[233] although scholarly debate on the dating continues. This narrative work is divided into nine books and is essentially a treatise summarizing the seven liberal arts, but it was made more enticing to its readers by converting the scholarly details into the form of a mythological story into which the teachings were embedded. Most of the astronomy is found in Book VIII of *The Marriage*.[234] The allegory focuses on a wedding where Mercury, the bearer of learning, introduces the seven handmaidens to his bride, Philology, each of the seven symbolized one of the seven liberal arts. Then each of the 'Arts'in turn presents her discipline to the assembled gods. Astronomy carries in her hands a measuring instrument and a book containing the predestined courses of the stars and planets. The account of Martianus is full of general astronomical information under the veil of allegory, and although not presented in a systematic way, was used as an advanced text in Carolingian 'schools'. His description of planetary theory and the planetary spheres is clearer than any of the other early writers, simple to follow, mainly derived from Pliny. Extensive commentaries on the work of Martianus Capella were written by Carolingian scholar, John Scottus Eurigena in 852.[235]

The Carolingian educators were quite fascinated with the writings of Martianus Capella, and copied his allegory of the seven liberal arts numerous times. Seventeen manuscripts of the

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Calcidius translated the cosmological section of Plato's Timaeus and wrote a long Neoplatonist commentary on it. His commentary discusses the sphericity of the earth and the universe, the circles that surround the cosmos, i.e. the equator, the tropics, arctic and antarctic circles, the Zodiac, the horizon and meridian.

233 Laistner 40

234 See L. Lenaz, Martiani Capellae: De Nuptiis Philologiae et Mercurii Liber Secundus (Padua, 1975). D.R. Shanzer, A Philosophical and Literary Commentary on Martianus Capella's DeNuptiis Philologiae et Mercurii Liber 1 (Berkeley, 1986). W.H. Stahl and R. W. Johnson, with E.L. Burge, Martianus Capella and the Seven Liberal Arts, 2 vols. (NY, 1971 and 1977)

235 For a full discussion of the commentaries see McCluskey (1993) 171-73.

complete *Marriage* and four manuscripts of Book VIII survive from the ninth century, many of which are glossed or illustrated. In the twelfth century revival, it was popular as both a textbook and a literary source. As evidence of its popularity, there are 241 manuscripts of the *Philologia* extant.[236] The beautiful hand-maidens imagined by Martianus were immortalized in the later Middle Ages by sculptors in artistic personifications of the Seven Liberal Arts on the west facade of Chartres Cathedral and in illuminated manuscripts, such as Herrad of Landsberg's *Hortus deliciarum*.[237]

Recent studies of the astronomy of Martianus Capella by Bruce Eastwood in *The Revival of Planetary Astronomy in Carolingian and Post-Carolingian Europe* credit him with the survival of heliocentric theories important in the history of science.[238] When discussing the astronomy of the Latin writers of late Antiquity, Eastwood remarks that Martianus alone offers a heliocentric orbit for the planets Mercury and Venus.[239] This theory appears in diagrammatic form in Carolingian manuscripts, proving that the heliocentric hypothesis of Greek scientists still flourished in part. This important information will be discussed in more detail in Chapter 4. As a whole his work is a competent summary of the seven Liberal Arts, and his allegorical presentations exerted a strong appeal for both students and writers for a thousand years. Martianus' personification of the Arts became the standard representation in the Middle Ages.

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[236] G.W.Bowersock, Peter Brown and Oleg Grabar, *Late Antiquity; A Guide to the Postclassical World* (1999) 566

[237] For information on the personification of the Liberal Arts in literature and sculpture, see Emile Mâle, *L'art religieux de XIII siècle en France*, Paris, 1948. See also Rosalie Green et al, *Hortus Deliciarum/ Herrad of Hohenbourg*, Warburg Institute, 1979, *Seven Liberal Arts* miniature appears on f. 32, pg. 104, plate 18.

[238] See Eastwood and Graßhoff for a complete explanation of Plinian diagrams found in both Martianus and Macrobius manuscripts.

[239] Lindberg 146 This feature is also reported in other studies such as Lindberg's. He mentions also Copernicus who cites Martianus Capella in support of his heliocentric system.

3.1.6 Illustrated Manuscripts of Macrobius

Though a near contemporary of Marianus Capella, almost nothing is known for certain about the life of Macrobius Ambrosius Theodosius, except that he is credited with three works preserved from antiquity. Of the three, the most eagerly-read, *Commentum in somnium Scipionis,* has survived intact; the much longer work, *Saturnalia,* is incomplete; and his treatise *On the Differences and Similarities of the Greek and Latin Verb* has been lost, but a medieval abridgement of it survives.[240] The *Commentary on the Dream of Scipio* by Macrobius achieved enormous popularity throughout the Middle Ages, and was considered one of the basic source books for medieval science. This tradition is important for its role in the transmission of astronomical information, but not for illustrations.

Experts believe that Macrobius, born circa 360, was a Roman author and Neoplatonist philosopher who flourished during the reigns of emperors Honorius and Arcadius (CE 395-423).[241] It is thought that he is the Macrobius who is mentioned in the Codex Theodosianus as a praetorian prefect of Spain in 399-400, proconsul of Africa in 410, lord chamberlain in 422.[242]

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[240] Stahl 3

[241] Stahl 4 Few personal facts can be found in his writings, he mentions a dearly loved son, Eustachius, to whom he dedicated his major works, and he discloses that he was 'born under another sky', not a native of Italy. He states the various positions of contemporary researchers as to the birthplace of Macrobius. Most scholars place him in Africa, a few favor Greece, but he writes in Latin. Furthermore his writings display a greater familiarity with Latin than with Greek authors and he frequently mistranslates Greek words.

[242] Stahl 6 He presents a full account of the reasoning of scholars on whether Macrobius was Christian and why Christian dogma would not enter into the material of the ancient Greek authors under discussion. Scholars still

The *Commentary* of Macrobius is based on the brief but well-known *Dream of Scipio* narrated by Cicero in the sixth and last book of his *De Republica*. In the *Dream*, Scipio appears to his adopted grandson and describes to him the life of the good after death and presents the nature of the cosmos from the Stoic point of view. The purpose of Cicero was not to teach astronomy, but to use cosmology to explain the value and immortality of the human soul. Macrobius uses the *Dream* to elaborate upon the doctrines of Neoplatonist philosophy that he had studied extensively.[243] His writings were an important source of Platonism in the Latin West, 'praised for its succinctness and lucidity', and for making the basic doctrines of Neoplatonism intelligible to his readers.[244] The first four chapters of Book I are a basic introduction, chapters 4 to 14 discuss the core of his work on the origin and descent of souls, reinforcing the belief of Plato and Cicero and citing the opinions of twenty-one philosophers in support of the immortality of the soul after death. From chapter 14 to the end of Book II the cosmographical and astronomical material is found, comprising nearly half of the *Commentary*, and often bound separately. Numerous manuscripts survive that contain only this section. Historians of science consider Macrobius one of the most prominent authorities on astronomy

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debate his identity since the holders of high office at that time were required to be Christians. The extant writings of Macrobius fail to make a single reference to any doctrines of Christianity, but recent scholarship sees little conflict between this fact and whether he was a Christian. There is no reason to expect references to Christianity since his subject matter in *Commentary* concerns the philosophical tenets of Neoplatonism and *Saturnalia* pertains to pagan antiquities and classical literature.

243 Laistner 42

244 Stahl 10 Scipio's Dream by Cicero is an imitation of the Vision of Er, the closing episode in Plato's Republic; Macrobius is credited with its survival. According to the philosophy that Macrobius discusses, souls descend from the sky at the intersection of the Milky Way and the Zodiac. As individual souls pass through each of the planetary spheres, they acquire a specific attribute which they are to experience and learn from during their life on earth.

and geography for the Middle Ages.[245]

Macrobius' *Commentary* was widely read throughout the Middle Ages as his subject matter was of enormous interest. In addition to the astronomical information, he had compiled information on the interpretation of dreams, the sacred Pythagorean number symbolism, the nature of the soul, the descent of the soul from its celestial origin into human bodies, and Neoplatonic philosophy. Macrobius' writings encompassed the motions of the celestial spheres and the order of the planets, the method used in distinguishing the Signs of the Zodiac, proof that the Earth is in the center of the universe, numerical ratios of planetary distances, the origin of the harmony of the spheres. An examination of Macrobius' work shows that he elaborates on the attributes of the planets, their spheres, and their appearance in each Sign of the Zodiac, but barely mentions any of the other constellations by name. He provides no listing of the known constellations, and therefore drawings of the pictorial cycle found in manuscripts of the *Aratea* are not expected, nor are they found.

Even though figural representations of the constellations are missing, explanatory diagrams are plentiful. Manuscripts of the *Commentary* include numerous types of diagrams, both celestial and terrestial. The cosmological schema include depictions of the entire Earth-centered Universe, the causes of eclipses of the Sun and Moon, and diagrams showing the position of the planets of the solar system. The terrestial diagrams depict the zones of the Earth marked with five climatic zones: torrid at the equator, bound by temperate zones above and

245 Stahl 24 - 39 Here he explains the latest scholarship on the various sources from which Macrobius drew. Scholars have now shown that, like other Latin compilers, Macrobius borrowed extensively from contemporary writers; but cited classical authors as their sources. It is generally agreed that the writings of Macrobius were not original, and that he borrowed extensively from Porphyry.

below, and finally frigid zones at the extremities, and world maps, and even rain patterns are plentiful. Some depict the habitable world of the northern hemisphere and the uninhabited world of the southern hemisphere. Maps of Macrobius are oriented with North at the upper part, unlike the majority of medieval *mappae mundi* with their Christian orientation that picture East and the Garden of Eden at the top and honor Jerusalem as the center of the world. These various types of celestial diagrams and world maps found in Macrobian manuscripts were later reproduced in the works of Bede, Lambert of St-Omer and other encyclopedists.

The *Commentary on the Dream of Scipio* by Macrobius was very influential among early medieval writers such as Isidore, Bede and Johannes Scottus Erigena; and even more so later as he is quoted as a classical authority by Adelard of Bath, Bernard Silvester, John of Salisbury, William of Conches, and Vincent of Beauvais, all of whom drew heavily from his work. Even Albertus Magnus, Thomas Aquinas, and Chaucer often cited the writings of Macrobius. When looking at extant secular manuscripts from the medieval period, copies of the *Commentary* are among the most numerous, numbering in the hundreds.[246] Like Aratus, Macrobius has been recognized by modern astronomers as they have named a crater on the Moon in his honor.

[246] Stahl 60 Lists of surviving manuscripts can be found in Max Manitius, *Handschriften antiker Autoren in mittelalterlichen Bibliothekskatalogen* (Leipzig, 1935), pp. 227-32 and in *Macrobius.Opera quae supersunt*, ed, L von Jan, Leipzig, 1848-52.

3.1.7 Illustrated Manuscripts of Isidore

As the years of Late Antiquity gave way to the early Middle Ages, the more advanced scientific texts of the classical authors had all been lost. After a period of great advances in the discovery and formulation of astronomical knowledge through Hellenistic times, 'science' had declined to an elementary level. The tenets of Christianity had taken hold and redirected the central concepts of astronomy. Natural phenomena of the celestial and terrestial worlds were no longer associated with mythical gods or with vague philosophic forces, but instead were orchestrated and controlled by one omnipotent Ruler overseeing His creation. The Stoic philosophy of Aratus, which emphasizes the phenomena of the heavens as signs from Zeus to assist humanity, was no longer appropriate in the Christian cosmic outlook. In spite of that, the poem of Aratus persisted, surviving in its Latin forms, although its transmission through this period cannot be traced except for brief appearances. In his writings, Isidore of Seville looked back to the manuscripts of Germanicus and compiled some of his astronomical information from the scholia of Germanicus' *Aratea*.[247]

Isidore of Seville

The first encyclopedist of the Middle Ages, Isidore of Seville (560 - 636) is considered the most learned man of his era, a bishop, theologian, and compiler of ancient knowledge. When only thirty years old, Isidore succeeded his brother as bishop of Seville, he remained in that position until his death in 636. His entire life was devoted to scholarship, which extended to

[247] Laistner 124

every known field of study; his desire for secular and scientific knowledge was as strong as his religious concerns. The extent of his reading and the variety of subjects on which he wrote supply evidence for the richness of the library at Seville.[248] In addition to his religious duties as bishop, he managed to produce numerous writings embracing a huge variety of subjects both secular and religious, *De natura rerum*, *Synonyma*, *Sententiae*, a history of the Goths, and his masterwork reaching almost 1000 pages in twenty books, the *Etymologiae.*[249] His method in writing this was to adapt and condense what he had read, retaining information he thought most essential. He preserved ancient science for later readers, and amplified that knowledge with his Christian commentary.

Isidore has sometimes been berated by historians for his inaccuracies and lack of originality, and because most of his writings are simply compilations of earlier classical or Christian authors. He contributes little in the way of new ideas or interpretations, either to theological doctrine or to the secular material. But it is important to remember that the main goal of scholarship during this era was not originality, nor creativity. The intent was to explain, clarify and disseminate what was already known, that 'sacred' knowledge passed down from antiquity or from biblical times, and also to preserve that corpus of received knowledge against error. "Isidore preserved Roman cosmology which formed the basis of early medieval cosmological thinking and was the main pre-Carolingian channel for the transmission of ancient knowledge

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[248] Saxl, "Illustrated Encyclopedias 1" 228-9 The model for Isidore's encyclopedic work goes back to Latin models, not Greek, as the Greeks had no inclination for encyclopedias. Varro wrote forty-one books on the antiquities of human and divine things, but Isidore's library did not contain a copy.

[249] McCluskey 124 The Visigothic king, Sisebut asked Isidore to explain the causes of natural phenomena, such as the lunar and solar eclipses seen in Spain. Isidore as requested wrote his treatise *On the Nature of Things*.

and concepts."[250] He amassed information on the Seven Liberal Arts, medicine, geography as well as astronomy, and brought together in a diagrammatic form; the six days of Creation, the six world eras, and the six ages of human life.[251] His compilations became convenient, standard reference material made available for study and found in every sizeable monastic library; they were used and copied profusely by later generations.[252]

For this study, the only writings of Isidore of interest are his compilations of the astronomical information, in *De natura rerum* and *Etymologiae*. His *De natura rerum* is the shorter of the two scientific works, including both secular and religious material. He describes celestial phenomena: the world axis, the poles and the ecliptic and makes clear the distinction between astronomy and astrology, which he rejects as superstition. Isidore's writings are amplified with numerous rotae, and in fact many of the large variety of diagrammatic forms were original inventions credited to the author himself. *De natura rerum* is also known as *Liber rotarum* because of its many circular diagrams, presenting a breakthrough in scientific book illumination. Isidore was the first medieval writer to develop a method of bringing text and illuminations together without using the common classical and Early Christian technique of adding personifications.[253] The astronomical writings in *Etymologiae* are not extensive and are scattered throughout the encyclopedia; most are found in Book II, but are merely brief

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[250] Kühnel (2003) 93

[251] For detailed information on the illustrative tradition of medieval encyclopedias, see F. Saxl, Illustrated Encyclopedias 1, *Saxl Lectures*, London: The Warburg Institute, 1957

[252] Laistner 124 A long list of writers from the seventh to the tenth century who used excerpts from Isidore, could be assembled. A complete list of extant manuscripts produced from Isidore's time until the mid-ninth century can be found in C.H. Beeson, *Isidorstudien* (Munich, 1913)

[253] Kühnel 74 (2003)

explanations of ancient learning.[254] Isidore's astronomical material was not the advanced mathematical material of Greek scholars, but primarily the popular 'science' found in *De astronomia* of Hyginus and the scholia on Germanicus' *Aratea*.[255]

Isidore's *De natura rerum* was an instant success, as it was copied in monastic scriptoria almost immediately after it had been written. The first recension is dated 613 and there are seventeen pre-Carolingian manuscripts extant.[256] M. Mostert lists seven from Fleury and Cambrai dating to the seventh century, all in the Library of Fleury.[257] In addition, thirty-three manuscripts of *De natura rerum* are known from the ninth century alone. The *Etymologies* has been named "one of the most popular books of the entire Middle Ages", as almost every library held a copy; it survives in more than a thousand manuscripts.[258] Was Isidore's encyclopedic work illustrated originally? According to Saxl, probably not, but later versions could have been fully illustrated along with the numerous diagrams they carried. Later medieval encyclopedias all look back to Isidore's sixth-century model. Some of Isidore's works began to circulate outside Spain during his lifetime and his popularity spread throughout the rest of Europe,[259] as early manuscripts of his work survive from South Germany, Austria, and North Italy, but Isidore's encyclopedic work was soon eclipsed by the scholarship of Bede.

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[254] Laistner 122 *Etymologiae* had been edited and separated into twenty books by his friend, Braulio, bishop of Saragossa, who also composed a short biography of Isidore and a chronological compilation of his writings.

[255] Laistner 124

[256] Kühnel (2003) 95

[257] Mostert, *Library of Fleury: A Provisional List of Manuscripts*, Hilversum, 1989 (*Medieval Studies and Sources*, 3)

[258] Lindberg 158

[259] Bischoff (1994) 4 "Only the works of Gregory the Great were diffused as rapidly as those of Isidore."

3.1.8 Illustrated Manuscripts of Venerable Bede

Some historians have confused the 'popular' astronomy found in Aratean manuscripts with the more exact astronomy necessary for establishing the ecclesiastical calendar, a topic of crucial concern in the Middle Ages. Bede's extensive study of astronomy led him to undertake his own research by collecting data on celestial motions, time and the tides. Bede (673 - 735) began composing his computistical works shortly after he was ordained a priest around the year 703.[260] Although Bede was the most widely-read and admired scholar of his age, he himself probably had access to less than 300 separate works in his monastic library. In addition to his own scientific analyses, Bede drew from earlier authors, in particular, Pliny the Elder, Macrobius and Isidore.[261] When evaluating his writings, scholars have determined a wide range of quality in Bede's scientific work; some was less than adequate, some was quite precise, and "some stands out as so remarkable that it seems to surpass the boundaries for his time and place and culture".[262] The adoption of the system of organizing time by counting the years successively from the birth of Christ, *Anno Domino* or the 'Christian era', still in use today, became accepted throughout Europe mainly through the influence of Bede.[263]

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[260] Bede entered Wearmouth monastery at age seven where he was educated by Benedict Biscop and Ceolfrid, abbot of Jarrow, both accomplished scholars. Though never leaving the isolated area of northern England, he mastered Greek, Latin, mathematics, music and astronomy and became the most illustrious scholar, teacher and writer of medieval England.

[261] Bede quotes the second book of Pliny Secundus in Books XXVII, XXX, XXXI, XXXIV, XXXV of his Natural History. (Charles W. Jones edition)

[262] Stevens *Cycles of Time* 1

[263] Stevens *Cycles* 169

His pivotal writings on time, the *computus*, became the standard reference work for the next thousand years, directed of course toward Christian exegesis, and predicting future dates for the celebration of ecclesiastical events, especially for determining the date of Easter. In spite of the fact that the *computus* is difficult and quite tedious, writings on time-reckoning survive in enormous numbers, since every religious community needed to determine the correct dates.[264] The astronomical data dealing with the cycles of time were never entirely satisfactory, and required constant adaption of the reckonings to keep computations in line with the irregular motions of the sun and moon for which Bede's computations and instructions were fundamental. The titles of his three well-known treatises that focus on astronomy are *De natura rerum*, *De temporibus*, and *De temporum ratione*, in addition he produced more than forty texts on history, science, poetry and hagiography.

De temporibus

On Time was one of Bede's earliest works, his first treatise devoted to the calendar, for which he was indebted to Irish models.[265] This work is a focused and concise computistical manual, explaining the units of time, the nineteen-year cycle of the moon, and the Paschal table. Bede avoided mixing computus with cosmology, and so does not mention the Sun, Moon, Zodiac or solstices and equinoxes in this treatise. Therefore illustrations and diagrams would not be required and would have no place in *De temporibus*, only Easter tables were included with

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[264] Stevens *Cycles*, intro. According to *computus* scholar Wesley Stevens, more than 9000 computistical tracts can be found in Latin manuscripts transcribed before 1600, approximately 1200 of them were written between the eighth and the eleventh centuries. He reports, "Those manuscripts have revealed unexpected evidence that early Christians drew more heavily and more specifically upon Hellenistic mathematics and natural sciences than any lectures, articles, or books had ever recognized much less explained".

[265] Faith Wallis *Bede: The Reckoning of Time*, Liverpool University Press (1999) lxv

these writings.

De natura rerum

Bede produced *De natura rerum* shortly after his *De temporibus*, drawing heavily from Isidore's work of the same name, except that Bede extended his version by three chapters, and he arranged some of the material in a new way.[266] Like Isidore, Bede begins with the universe as a whole and then descends to earth, discussing the atmosphere, oceans, rivers and lands. He employs the pattern of the four basic elements; fire is associated with the heavens, air refers to the atmosphere, water to the seas, and earth to the land masses.[267] Bede removed the section on time that Isidore included in his *De natura rerum*, since he had written on that separately. The subjects included in this work were likely to inspire diagrams and illustrations. But Bober states, "Bede's *De natura rerum* was not originally accompanied by illuminations, as attested by the earliest copies which exist in quite a large number of examples; the earliest manuscripts to be accompanied by illuminations dates to1066".[268]

De temporum ratione

De temporum ratione, composed in 725, is a sequel to the other two, divided into four separate parts which contain in total seventy-one chapters. This treatise is a fusion of calendar science and natural history, in which he discusses the units of time, instructions for calculating the date of Easter, a world chronicle, and looks to the future of life on earth until the time of the

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[266] See H. Bober, "An Illustrated Medieval School-Book of Bede's *De natura rerum*", in *Journal of the Walter's Art Gallery*, 19-20 (1956-57) 65-97.

[267] Wallis lxv

[268] Bober (1956-57) 19

apocalypse.[269] In this work, Bede clarified and systematized the collected knowledge in computistics so comprehensively that the *De temporum ratione* became the prime source for the western European calendar up to the modern era.[270] Bede is careful to avoid references to astrology. In Book XIII, Bede states that the stars are made of different sorts of matter that affect the weather; however, he specifically says that the stars have no influence upon man's character and determine no human activities.[271]

This computistical book discusses the movements of the heavens, especially the Sun and Moon through the Zodiac. Time reckoning requires familiarity with the division of the sky into the twelve Signs of the Zodiac along with the concept of 360 parts as a basic scale for systematizing observations of the motions of the sun and moon. In Book XVI *De signis duodecum mensium*, Bede discusses the months of the year and pairs each with the appropriate Sign of the Zodiac, but he does not mention any of the other thirty-six Ptolemaic constellations; and even those twelve are strictly used as fixed mathematical points for determining the 360 degree course of the sun through the sky.

The original text of *De temporum* does not call for diagrams and scholars generally agree that it was not accompanied with them until a little later.[272] The diagrams were added after 725, the date of the earliest surviving manuscript to show the diagrams, unanimously attributed to the scriptorium of Fleury (Paris BNF Lat. MS 5543), and there is a slightly later London manuscript

[269] Kühnel (2003) 100
[270] Stevens *Cycles* 169
[271] *De natura rerum* XIII, ed. C. W. Jones
[272] Bede scholar, C. W. Jones has collated many of the surviving manuscripts and published an accurate version of his computistical writings. Jones examined 104 manuscripts of the *De temporum ratione*, none was written within seventy years of the date of its composition. He is strictly concerned with the text and glosses, paying almost no attention to illustrations.

(BL Harley MS 3017).[273] In Kühnel's study of diagrams, she notes that Bede's *De temporibus* and *De temporum ratione* "were probably accompanied by illustrations from an early period, since parts of them are already illuminated in the anthology in Cologne (Dombibliothek, Cod. 83 II, ca. 805) which has almost the complete text of *De temporum ratione* at the beginning of the ninth century".[274] The large survival numbers reinforces the enormous importance of Bede's three great works, often incorporated with other texts.[275]

De signis coeli

The Pseudo-Bede composition, *De signis coeli*, was a widely-used treatise on elementary astronomy hardly more than a star catalog incorrectly credited to Bede.[276] It was quite popular from the tenth to the thirteenth centuries. Although the work had a clear mathematical basis and purpose, its illustrations took the form not of geometric diagrams, but of constellation images. A manuscript of this work, Bodleian Oxford, MS Laud 644 (13th c.), is illustrated with the typical constellation cycle with a short text accompanying each picture.[277] Also in this manuscript, fragments of the *revised Aratus Latinus* (lines 582-594) are included on the same folio as Pseudo-Bede, in addition there are works of Boethius, Abu Ma'shar, Robert Grosseteste, and Gerard of Cremona's translation of Ptolemy's *Almagest*. The cycle of the constellation

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[273] Kühnel 69

[274] Kühnel (2003) 100

[275] Stevens, "Bede's Scientific Achievement", Jarrow Lecture 1985 in *Cycles of Time*, Appendix I *De natura rerum* can be found in135 manuscripts; his *De temporibus*, Books 1-16 survives in 97 manuscripts, Books 17-22 in 25; and *De temporum ratione*, Books 1-65 is extant in 245, Books 66-71 in 41 manuscripts. Appendix II presents a complete list of *De temporum ratione* manuscripts from the eighth and ninth centuries. Unfortunately there is no indication whether any of these are illustrated with figures or diagrams.

[276] See Ps-Beda Venerablis, *De Signis coeli* ed. E. Maass, *Commentariorum in Aratum reliquiae*, Berlin, 1898, pp. 582-594. Also cited in Van de Vyver, 'Traductions', Osiris I (1936) and Saxl and Meier.

[277] Saxl and Meier III 386-93 There are forty constellations pictured, ff. 8r-10v.

illuminations appear prominently in the encyclopedic tradition first established in the *Etymologiae* and *De natura rerum* compiled by Isidore, continued with the writings of Bede/Pseudo-Bede and expanded in the ninth century by Hrabanus Maurus.

3.1.9 Astronomical Illustrations in Hrabanus Maurus' *De rerum naturalis*

The illustrations of the constellations in manuscripts of Hrabanus Maurus have been compared to those found in *Aratea* manuscripts, but they actually have little in common. The writings of Hrabanus do include a few of the standard constellations, but many of the adjoining miniatures are quite distinct displaying very different iconography and containing some pictures never seen in *Aratea* manuscripts. The two traditions seem to have had very different models.

During the Carolingian renaissance, the growth of monastic schools saw the dissemination of Anglo-Saxon and Irish scholarship through France and Germany. Although he never produced a great scholarly work, Alcuin of York brought his experience and expertise to upgrade the educational system on the continent. Alcuin's outstanding student, the eminent scholar Hrabanus Maurus (c.780 - 856), became one of the most erudite teachers in Germany in the ninth century, both Alcuin and Hrabanus enjoyed and advocated the study of astronomy. Hrabanus became an educator at the royal palace in Aachen, where he also composed his much-praised religious writings. He taught at the monastery of Fulda as well, becoming abbot in 822; under his stewardship it became one of the most prominent schools in Europe. Through enormous effort, Hrabanus expanded the library at Fulda into one of the best learning centers in

the Carolingian empire for sacred as well as secular texts.[278] Eventually Hrabanus was named archbishop of Mainz.

Hrabanus Maurus compiled his great work, *De rerum naturis*, between 842 and 847, during his retirement at the monastery of Petersburg near Fulda. Like Isidore, he compiled information from a variety of sources, rewriting the original material in a more comprehensive and accessible form. The twenty-volume collection composed by Isidore was improved and enlarged into a massive twenty-two volume encyclopedic work, an altered edition decorated with numerous illustrations and Christianized with lengthy spiritual commentaries.[279] A total of five illustrated copies of Maurus' encyclopedia are extant, but none date to the ninth century. The earliest copy (Cod. Casinensis 132) dates to1022-23 and is still preserved at Montecassino, where it was produced.[280]

A dissertation by Diane Le Berrurier on the pictorial sources of Maurus' writings researches the sources and pictorial traditions of the surviving illustrated manuscripts of *De rerum naturis*, concentrating on the mythological and scientific illustrations; monsters,

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[278] Stevens, *Cycles* 178

[279] His sources, beyond Isidore and Bede, included church fathers, Ambrose and Augustine, interspersed with pagan writers Virgil, Priscian, Donatus, Pliny and Hyginus, whom he quotes in in Chapter 28. Hrabanus compiled rare works making them understandable and available for students who might not have had access to the vast quantity of information.

[280] Le Berrurier 2-3 *The Pictorial Sources of Mythological and Scientific Illustrations in Hrabanus Maurus' De rerum naturis,* Diss. University of Chicago, 1978. "Only the oldest and the most recent copies have a full set of miniatures." Beside the Montecassino manuscript with 339 miniatures, the second fully illustrated copy is Vat. Lib.Cod. Pal. lat. 291, which is dated to 1425 and contains 338 miniatures. The other three surviving copies are: Vat. Lib.cod. Reg. lat. 391, dated to the beginning of the fifteenth century, with only the first eight miniatures; Berlin, Preussische Staats. Cod. fol.lat. 930, attributed to Catalonian artists of the late fourteenth century, has 141 miniatures; Paris, BN MS. Lat. 17177, produced around 1200 in western Germany has only four miniatures on two separate folios. This study was published as an 'outstanding dissertation in the fine arts'.

astronomical and botanical illuminations.[281] Her study describes the number and location of extant manuscripts.[282] Stevens provides a full listing of sixteen extant manuscripts of Hrabanus' work, but does not mention illuminations.[283]

Most of the astronomical illustrations of Maurus' *De rerum naturis* are found in Book Nine, which consists of a prologue entitled, *De mundo et quatuor plagis ejus,* and twenty-nine chapters which discuss meteorology and astronomy, accompanied by lengthy Christian commentaries. The astronomical portions of twenty-two chapters are illustrated and according to LeBerrurier these were modeled on illustrations of the *Aratea*.[284] She lists the titles of twenty-two illustrations, of these only: *de coelo*, *de sole*, *de luna*, de Pleiadibus, *de Arcturo*, and *de Orione et Hyadibus*, appear regularly in *Aratea* manuscripts. The other astronomical illustrations: *de Lucifero, de vespero, de nubius*, *de igne*, *de carbonibus, de cineribus* and others, are not part of the cycle of constellations that are included in the typical program. Among the five surviving illustrated copies, the maximum number of constellation illuminations found is only twenty three, compared to forty-two to forty-eight that appear in most constellation pictorial cycles.

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[281] Le Berrurier, The section on monsters, trees, and plants, I am not qualified to comment upon, but the section on astronomy is full of errors and erroneous suppositions, for instance she refers to Eridanus as Enidris, does not recognize Canis Major and Sirius. She reports that the *Aratea* were written by Aratus, and that "the *Aratea* became very popular at the end of the Roman Empire".

[282] Le Berrurier 3-5 The earliest of the five surviving copies is decorated with miniatures which exhibit characteristics of southern Italian art of the time, but also show influences from an earlier period. This copy was modeled on a Carolingian manuscript as it has classical prototypes, its ultimate source for illustrations would have been ancient models.

[283] Stevens *Cycles* 190-96.

[284] Le Berrurier 63-64

The familiar celestial diagram from antiquity seen in mosaic floors consisting of the Signs of the Zodiac surrounding the personifications of Sol and Luna found in Cas.132 is similar to the diagram in the fifteenth-century *Aratea* manuscript (Vat. cod. gr.1087). The Signs are arranged in the same counterclockwise order with Aries at the midheaven. The Vatican *Aratea* manuscript is of a much superior quality; the only difference is the orb of the Sun held by Helios in the *Aratea*, is omitted in the Maurus copy. LeBerrurier proposes that the Hrabanus manuscript of the eleventh century is based on the Vatican Greek manuscript which dates to the fifteenth century, not quite possible. But there were numerous sources that could have provided this popular astronomical motif.[285] Except for a very few miniatures, the majority of astronomical illustrations in the surviving Hrabanus manuscripts are unique to that tradition and do not belong to the constellation cycle seen in manuscripts of the *Aratea*, nor those in the Hyginus or Isidore/Bede traditions. Therefore, I see little connection or influences between the two manuscript traditions. In addition, the astronomical material in Maurus' manuscripts has been heavily Christianized, which is never the case with the *Aratea*. While at Fulda, Hrabanus was the teacher and friend of Lupus of Ferrières, who plays a part in the history of *Aratea* manuscripts as he was known to hold a copy.

Lupus of Ferrières

Scholar and teacher, Lupus of Ferrières, is an important figure in the transmission of *Aratea* manuscripts as he mentions in one of his surviving letters that he has a Cicero

[285] Le Berrurier also suggests that the illustration of Helios in the Cod. Pal. Lat. 291 copy of Maurus was modeled on the iconography of Auriga. This is definitely not the case since Auriga is always dressed as a worker, not the Lord of the Sun, furthermore Auriga is always accompanied by his goat and its kids and has a small square farm cart with two horses, not the magnificent chariot and four horses of the Sun God.

manuscript. Lupus corresponded regularly with his fellow scholars on literary and religious points. Demonstrating that books were not the only means for the transmission and distribution of scientific knowledge, Lupus wrote many letters 'discussing scholarship' which provide 'examples of informal and formal methods for the exchange of ideas'.[286] Lupus was born during the last decade of Charlemagne's reign and was educated at the monastery of Ferrières, where scholastic resources did not seem to be great.[287] His family was wealthy, but had no access to real power. Lupus became abbot of Ferrières in 840, but he never became a bishop, never was assigned to a large or powerful monastery, and never received an official court appointment.[288] In addition to his religious duties, he was also obliged to take part in the campaigns of Charles the Bald, often acting as emissary.[289] Empress Judith was generous toward him, possibly they were related.

Fortunately 127 of his letters, written between 830 and 862, survive and these contain valuable information about his literary and humanistic studies. In a letter written to Einhard, Lupus refers to a list that he had seen of the books possessed by Einhard.[290] Lupus became an excellent scribe and there are at least a dozen extant manuscripts that were revised or annotated

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[286] McKitterick (1994) 26

[287] Laistner 252 The poor and obscure monastery of Ferrières was located south of Paris, between Orleans and Sens. Due to the poverty of the monastery, their library was small and limited; therefore Lupus was sent to Fulda to complete his education. There Lupus was taught and befriended by Hrabanus Maurus; he also corresponded with Einhard and met other young monks who, like Lupus, became heads of religious houses.

[288] Noble 239

[289] Laistner 253

[290] *Lupus of Ferrières, Ep. I, Correspondence*, ed. L.Levillain (Paris, 1964); English translation, G.W. Regenos, *The Letters of Lupus of Ferrières* (The Hague, 1966), no. 1. For more information on Lupus, see also *Lupus as Scribe and Text Critic* by Charles H. Beeson, Cambridge, MA, 1930.

by him.[291] What is unparalleled in his studies, is his eagerness to obtain a second manuscript of a particular work that he already possessed so that he could compare the two, then improve his own copy. Lupus was quite familiar with the writings of Cicero, including his version of the *Phaenomena.*[292] His letters show that he borrowed a manuscript of Cicero's *Aratea* from Ansbald of Prüm, so that he might restore his own defective copy of the *Aratea,* in order to create an improved text (Epistle 69). Writing in September of 847 to the monk Asnbold, Lupus says, "I shall collate the letters of Cicero which you send me with my own copy so that, if it be possible, I may get an accurate copy from the two. Will you in turn send me Cicero's *In Arato* with this courier of mine, so that the portions which are lacking in this copy, as pointed out by our Eigil, may be supplied from the one which I hope to obtain."[293] Unfortunately it is not known for certain which manuscripts he refers to, nor if either manuscript is extant. Saxl suggested that since Harley 647 is carefully corrected, it may have been done by Lupus himself or one of his pupils[294]; but this has not been verified. The *Aratea* manuscripts continued to be copied and were included in many astronomical anthologies. The well-known twelfth-century compendium, *Liber Floridus,* contains an illustrated cycle of the constellations sometimes referred to as an *Aratea* manuscript, but it is actually an often-copied astronomical treatise credited to Pseudo-Bede, but may contain bits of the *revised Aratus Latinus*.

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[291] Laistner 254 Lupus, while at Fulda wrote and illuminated a large manuscript in which five Germanic law codes were brought together. Among the manuscripts that he handled were Valerius Maximus at Berne (No. 366), Aulus Gellius (Vat. Reg. 597) and Ti. Claudius Donatus' commentary on the first six books of the *Aeneid,* and four manuscripts now in Paris, Cicero's the *Letters of Symmachus* (Lat. 8623) and Macrobius' *Commentary on the Somnium Scipionis* (Lat. 6370).

[292] In his earliest letter to Einhard (Epistle 1), he seems to imply that even as an adolescent pupil in Ferrières he was already a keen Ciceronian. His own literary style shows the influence of his study of Cicero.

[293] *Letters of Lupus of Ferrières,* p 81

[294] Saxl, "Belief in Stars", *Saxl Lectures*, 88 This is discussed further in Chapter 4.

Astronomical Illustrations in the *Liber Floridus*

Another key entry in the long tradition of encyclopedic works was compiled by a medieval scholar, Lambert, canon of the church of Our Lady at St-Omer.[295] Since his autograph manuscript survives intact, we know that it was originally designed with the illustrated constellation cycle. The *Liber Floridus* was taken to Ghent shortly after its completion in 1121, possibly as early as 1136, and today is housed at the University Library there.[296] The *Liber Floridus* is truly comprehensive in its scope of information, ranging from world history, science, genealogy, botany and religion, scholars have identified almost 100 different sources as reference works for the textual material.[297] Many of the models that Lambert used were known to be in the library of St-Omer or at St-Bertin nearby.[298] Earlier encyclopedic works compiled by Isidore of Seville, Bede, and Hrabanus Maurus and others, were probable models, but Lambert's work is expansive because it includes world maps, a variety of illustrations, and numerous rotae, which became so popular in the Middle Ages. The series of cosmological diagrams were inserted to explain his text and to visually summarize the main concepts necessary to understand the workings of the heavens. Lambert includes Macrobian zonal maps, eclipse diagrams, wind rotae,

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[295] *Liber Floridus*, Rijksuniversiteit te Ghent Bibliotheek, MS 92.

[296] There were at least eleven medieval copies made of it, with nine extant in various European libraries, and there is a facsimile edition made in 1968. The earliest and most accurate copy of the original is Wolfenbüttel, Ms. Gud. Lat. 201 made in the last quarter of the 12th c., the latest copy is dated 1512. The *Liber Floridus* consists of 287 numbered folios with illustrations on 64 of its folios, several sections are missing in the original, but survive in its many copies.

[297] Derolez 29 The latest study of the *Liber Floridus* was published by Albert Derolez in 1998; his work focuses on textual analysis and palaeography.

[298] Derolez 29 Some evidence indicates that Lambert may have been the librarian at St-Omer. He also left marginal notes, corrections and additions in books that he used. A listing is provided in the appendix on pp. 194-96. Also listed are the articles written on the history, illustrations, and maps of the Liber Floridus, including an article by Hanns Swarzenski, 'Comments on the Figural Illustrations' and another by Jessie Poesch 'The Beasts from Job in the Liber Floridus Manuscripts'. pp. 5-9.

and has used them effectively and adapted them to incorporate Christian ideals.

The full cycle of constellations is illustrated on seven folios in the *Liber Floridus*. The leading folio is devoted to a verbal description of the twelve months and the Signs of the Zodiac (88v), arranged clockwise in small squares, with Helios and his chariot encircled in the center with the five planets shown as flowerlike stars and the crescent Luna above and below. The next six folios (89r-91v) portray forty-two constellations squeezed amidst the lines of text that explain each one. The title of this section is *De ordine et positione signorum* and the descriptive text is a variant version of Pseudo-Bede's *De signis coeli*.[299] The constellations are divided into uneven sections, each outlined to distinguish and separate it from the others; crowded six to eight on a page to conserve space. The constellations follow in almost the exact order of the *Phaenomena*. The cycle begins with Ursa Major and Minor, which are called Helice and Cynosura, (as per Aratus, except in reverse order), and ends with Corvus, Crater and Anticanis or Procyon. The constellation drawings of the *Liber Floridus* were most probably drawn by Lambert himself, since they are unsophisticated and rather amateurish, and intertwined with the text which is written entirely in his own hand.[300] The constellation figures employ the iconographic traditions established in antiquity with their standard emblems and classical drapery style, many nude with cloaks, but they are thought to be copied from a 9th or 10th century exemplar, not an Late Antique manuscript. Only two heroes, Hercules and Serpentarius, are depicted from the back, globe style.

The Leiden *Aratea* was known to have been in the Saint-Bertin library during Lambert's

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[299] Derolez 100 credits E. Mass, *Commentariorum in Aratum reliquiae,* Berlin, 1898, pp. 582-592.
[300] Derolez 21 He states that Lambert writes in an old-fashioned type of late Caroline minuscule.

lifetime, since two copies of it were made there in the tenth century.[301] Lambert may have seen an *Aratea* manuscript, but the Leiden *Aratea* was not his model, only one of his constellations has a close resemblance to those pictures.[302] Lambert does include text excerpts from an Aratus commentary on folio 94r.[303] Derolez states, "The Constellations are obviously copied from an Aratus manuscript, but strangely enough not from the Aratus codex in Saint-Bertin abbey".[304] Lambert's text is entirely different from the poetic form of the *Aratea*, as he lists the number of stars in each constellation and tells where they are positioned, his illuminations were probably modeled on the same source as his text. His grouping of many illustrations on a page is similar to the Pseudo-Bede layout. As I have demonstrated, *Aratea* manuscripts were not the only place to look for the cycle of constellation pictures; they could be found in illustrated manuscripts of Pliny, Hyginus, Isidore and Pseudo-Bede.

Inspite of its limitations, Derolez calls the *Liber Floridus* 'a work of great originality and exceptional richness', ..'the best example of a Romanesque encyclopedic work'.[305] Following Lambert's encyclopedic work, the scholastic encyclopedia emerged. But the encyclopedic tradition, in which all the world's knowledge could be compiled or condensed into one large volume, changed drastically during the twelfth century as the quantity of scientific and

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[301] The two copies are Boulogne-sur-Mer BM MS 188 and Bern MS 88; they are discussed in Appendix B.

[302] Derolez 31 "Gerard Isaac Lieftinck has shown that Lambert's depictions of the constellations do not derive from one of the famous Aratus manuscripts of Saint-Bertin's, as the latter descend from a Late Roman model, whilst Lambert's constellations belong to the Isidorian tradition." The 'Aratus' manuscripts are actually the *Aratea* of Germanicus.

[303] Derolez 100 Here he credits *Excerptum de astrologia Arati*, ed. Maass n. 167, p. 309, for the source of the commentary.

[304] Derolez 100 He continues, "One really wonders how Lambert ever had access to another copy of these rare illustrations". This study has shown that the illustrations were not rare at all, but quite popular.

[305] Derolez 182

philosophic writings exploded in an enormous efflorescence thanks to the treasures uncovered in the Arabic libraries.

3.2 ILLUSTRATED ARABIC MANUSCRIPTS - ELEVENTH AND TWELFTH CENTURIES

An enormous factor in this study of the transmission of astronomical knowledge in the Middle Ages is the contribution made by scientists and astronomers from the Arab World. This section examines the role of Arabic scholars, writers and artists at the time their manuscripts were translated into Latin and their illustrations were copied and adapted by Western artists. This section looks too at where, when, and how the Islamic legacy interacted with classical traditions in Europe, and how the integration of Arabic influences in the Latin West enacted upon *Aratea* manuscripts, if at all.

Greatly concerned with celestial wonders, Arabic astronomers and astrologers preserved, modified, commented upon, and transformed their received astronomical knowledge for over 500 years before their accomplishments were known in the West. Scholars in the Near East, Northern Africa, and Spain worked and reworked astronomical principles, observations, and mathematics, producing an enormous number of writings. In addition to their own cultural and mythological heritage, Arabic authors had assimilated the corpus of astronomical knowledge from Greek and Indian sources. All of these ‘new’ writings became available to the Latin West for the first time upon the revelation and translation of Arabic manuscripts. The uncovering of

beautifully illustrated Arabic books revealed their proficiency not only in scientific fields but revealed artistic mastery as well. Their artistic techniques introduced new elements to the West, displaying a much higher degree of accuracy in the relationship of the pictorial images to the actual appearance of the constellations. Illuminated astronomical manuscripts created in the Arab World exhibited influences that were deeply rooted in classical iconography; but the traditional styles of Islamic artwork introduced many changes in design and visual accuracy.

One of the many elements in their illustrations, credited to Arabic exactitude, is their careful placement of stars within the constellations. Traditionally illuminators in the West had been quite lax and loose in their arrangement of the stars, just scattered about the constellations; in fact their representations of the constellation figures themselves were quite inconsistent, sometimes they had no correspondence to the actual star patterns. On occasion the artists would substitute any appropriate mythological image with no care to matching the figure to the true formation of the star pattern. But Arabic scholars, in contrast, considered the visual appearance of the constellations as symbols of reality, and made sure the artists were scrupulous in depicting the exact number of stars, positioning each one with absolute accuracy, and even indicating the star's brightness or magnitude.[306] Their familiarity with Ptolemy's cataloging system allowed them to issue a name to each star within the group, for instance, Aries alpha, beta, etc, numbering each star in order of its brightness. Significant stars of special brightness were given individual names as well, such as Mizar in Ursa Major, Betelgeuse in Orion, or Aldebaran in Taurus, Arabic names that are still in use today. Although very concerned with the placement and

[306] Ptolemy organized the stars by magnitude or brightness in a scale of one to six, one designates the brightest, for instance Sirius, and six is assigned to the dimmest stars that can still be seen with the naked eye.

appearance of the stars in their artwork, the Arab illustrators were not particularly interested in the early Greek myths applied to the constellations, or in retaining the classical costumes, or their iconographic attributes. This initial encounter or meeting place of the East and West in the twelfth century brings subtle and fascinating changes to the depictions of the gods, planets and mythological characters.

The sophistication of the astronomical knowledge and the accurate star descriptions held in Arabic libraries can be credited to the fortunate circumstances that led to their possession of Ptolemy's great works. Since the time of Ptolemy (flourished CE130), the principal center of astronomical studies had been Alexandria, particularly at the Neo-Platonic Museion, which at its peak had collected an estimated 700,000 papyrus rolls embracing every field of knowledge. Although greatly diminished and then mostly burned in 642, those scrolls and codices that still remained were transferred to Antioch in the early eighth century, by which time Islam had taken hold of the Middle East.[307]

A general introduction to Arabic astronomy and its role in the development of western science will help to place the astronomical illustrations created in the twelfth century in the proper prospective. Even before the spread of Islam, the far-flung Arabic societies had already possessed a thorough knowledge of the sky, necessary for orientation in the vast desert areas and for the great sailing cultures like the Phoenicians. Similar to all early cultures, the Arabs held astronomical knowledge for calendrical purposes, determining the seasons, and for planning social and ceremonial events. The folk-astronomy and astral myths from earlier periods

[307] Butzer 465

expanded as Islam spread through the Near and Middle East and encountered the scientific heritage of Greece, and also the traditions of India and Persia. By the eighth century, the Muslims had conquered vast areas of the former Roman Empire and enormous resources came into their possession, including the district libraries filled with extensive written material. Great centers of learning that had survived the decline of the Empire in the cities of Asia Minor and North Africa came under Persian rule, invoking an intellectual awakening in the Arab World. The combined knowledge of Eastern and Western traditions in astronomy and astrology opened new fields of study in which Arabic scholars made great advances. Under enlightened leaders, intellectual centers were developed to further encourage scientific studies.

In 762, Caliph al-Mansˆr (r.754-775) initiated the creation of the city of Baghdad, by then astrology had made such headway that he consulted astrologers to make preliminary calculations for auspicious beginnings for their new capital.[308] By the ninth century, Baghdad had become the cultural center of the Arabic world. Intellectual activities were encouraged and supported by the great ‘Abb~sid caliphs; two of the most influential early caliphs who sponsored Abb~sid scholars were the grandson of al-Mansˆr, H~rˆn al-Rash′d (r.786-809), who presented Charlemagne with a waterclock, and his son al-Ma’mˆn (r.813-833), during whose reign Baghdad probably reached its apogee.[309] It was al-Ma’mˆn who founded the *bait al-hikma*,

[308] For references on Islamic astronomers and scholars see, B.R. Goldstein, *Theory and Observation in Ancient and Medieval Astronomy*, Variorum Collected Studies Series, CS 215, London: 1985. D.C. Lindberg ed. *Science in the Middle Ages*. University of Chicago Press, 1978. P. Kunitzsch, *The Arabs and the Stars.* Variorum Collected Studies Series 307, Northampton: 1989. S.N. Nasr, *Science and Civilization in Islam.* New American Library, NY: 1970.

[309] Lindberg 168 H~rˆn al-Rash′d sent agents to Byzantium in search of manuscripts to copy and translate.

the ‘House of Wisdom’, a ‘proto-research institute’ which included a library, observatory instruments and translation rooms where noted scientists studied, taught and composed.[310] By seeking out texts from India, Persia, Egypt and Greece, the Arabic scholars synthesized their diverse sources into a universal body of knowledge which they nurtured and expounded. Caliph al-Mamˆn commissioned and supported the work of al-Khw~rizm′, mathematician and astronomer, from whom we get the term algorisms, and he also brought together the scholars who translated Ptolemy’s *Almagest* from Greek into Arabic. Under the aegis of al-Ma’mun writings of both Euclid and Aristotle were also translated. Just after that period of intense intellectual activity, the important astrological writings of Abˆ Ma’shar, whose contribution will be examined next, were produced.

Through the centuries, Baghdad continued to attract leading scientists who transcribed and commented upon additional Hellenistic texts. Baghdad and Cairo, both within the geographic range of former Late Antique intellectural centers, became focal points for the production of illustrated manuscripts. The caliphs encouraged scholars who were skilled not only in astronomy, but in mathematics, medicine, and architecture, and many original works were written under their patronage.[311] Arabic astronomers were active in studying the phenomena of the heavens, in making new observations with their improved instruments, and in recording

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[310] Butzer 466-67 Among the astronomers and mathematicians who worked there in addition to al-Khw~rizm′, were al-Kindi, al-Jawhar′, and al-Farghan′ who wrote an exposition of the *Almagest* which was translated in 1137 by John of Seville and Gerard of Cremona.

[311] The Arabic scholars had made great advances in mathematics by applying the concept of zero and substituting the cumbersome Roman numerals with Indian/Arabic numbers. They had made huge advances in astronomy by improving their measuring instruments, keeping accurate charts, developing technical terminology, applying mathematics, and even naming individual stars. They enriched classical knowledge with many original and creative ideas, discoveries and inventions.

eclipses, comets and star positions. Accurate calendars, times, and directions, especially to Mecca, were vital for religious observances. In direct contrast to Eastern progress and creativity, Western astronomers had been content to study the traditional body of 'scientific' knowledge, not directly from Greek sources, but as redefined by the authors of Late Antiquity, without an original contribution or change to what had already been written. Aside from computus studies, the same few popular, but superficial, astronomical manuscripts along with their illustrations were copied and recopied with little modification until Islamic contact, when the entire field was inspired and revitalized. This interaction of the Latin West with the Arab World changed forever the outmoded western tradition of just preserving ancient knowledge. The gradual exposure of the great strides attained by Arabic scholars created an enormous impact upon Latin scientists, pushing forward the development of Western science.

Introduction of Arabic Illustrative Traditions to the West

Of particular interest in this study is how the illustrations and diagrams which embellished Arabic manuscripts were presented, and whether Islamic artwork influenced western astronomical art, especially the *Aratea* illuminations. But it is impossible to separate the artwork from the author, the text, and the manuscript in which it appears as they are symbiotically linked. This section continues the examination of the transmission and survival of illustrated astronomical manuscripts as the vast corpus of knowledge held by the Arabic World was translated, studied, and then assimilated by the Latin World.

In the early Middle Ages, Europe had not completely lost touch with the Greek World and the Eastern Empire, but there were few in the West who could read anything but Latin. This changed in twelfth century as scholars learned Greek and, more importantly, Arabic in order to

access ancient knowledge. The translating movement began in the mid-eleventh century and did not abate until the mid-fourteenth century, during which time scholars and students from all over Europe were attracted to Arabic intellectual centers in Spain, southern Italy and Sicily. As a result of the eleventh century *Reconquista,* Toledo fell in 1085 to Alfonso VI, king of Castile[312]; and by the mid-twelfth century that city was thriving as Europe's most important center for the translation of Arabic texts into Latin. The Arabic libraries, brimming with their coveted knowledge, were now accessible to Latin researchers, who anxiously began their translating, assisted by Arabic and Jewish intermediaries. The longed-for astronomical texts were the first to be translated by Christian scholars, revealing to them the writings of Ptolemy, Plato, Aristotle and all the works they had thought lost. Not only did they find that the great Classical works were basically intact; but as a bonus they had been analyzed, commented upon, and appended by Arabic scholars, revealing that their theoretical mastery and observational techniques in astronomy were far in advance of those in Christian Europe.

As we have seen, and what cannot be over-emphasized, the fundamental source of astronomical knowledge in Arabic manuscripts was Ptolemy's *Almagest*, which had been translated into Arabic several times in the eighth and ninth centuries.[313] The interests of this study entails only the visual not the mathematical aspects of Ptolemy great work; the *Almagest* comprises a catalog of 1,025 stars with their arrangement into the forty-eight classical

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[312] Bosch 26 In the seventh century, Toledo was declared the leading diocese, giving it precedence over other Spanish dioceses, and it was also declared the capital of the Visigothic kingdom., making it the religious and civic center of Spain.

[313] Ptolemy's *Almagest* was for astronomers what his *Tetrabiblos* or *Quadripartitum* was for astrologers. Scholars long doubted that the *Tetrabiblos* was actually written by Ptolemy because they were unwilling to believe that he was an active astrologer.

constellations including their latitudes, longitudes, and magnitudes. Ptolemy's work was known about in the West, but none of his Greek manuscripts survived. (The Carolingians missed here, because unlike the *Phaenomena* of Aratus, the writings of Ptolemy had not been translated into Latin.) It will probably never be known whether Ptolemy's early texts were accompanied with any illustrations beyond technical geometric diagrams. What can be examined are the manuscripts of later Arabic writers that do survive. The next section will look at astronomers from the Arab World who built upon the work of Ptolemy, and how their writings were illustrated. The study will then discuss the primary European scholars responsible for translating Arabic texts into Latin, and show how the clash of differing artistic traditions manifests in illustrations of the constellations. Does this exotic influence from Eastern artistic sources affect the production of manuscripts and miniatures of the *Aratea* tradition?

In the West, the four most renowned of the great Arabic astronomical writers were Abu Ma'shar, Al-Sˆf′, Averroës, and Avicenna (Ibn Sînâ). Avicenna and Averroës included astronomical principles in their writings but were more focused on the philosophical writings of Plato and Aristotle and were not illustrated, while treatises of Abˆ Ma'shar and Al-Sˆf′ were uniquely illustrated and instrumental in the transmission of astronomical and astrological knowledge.

Abˆ Ma'shar: Life and Works

The writings of Persian astronomer/astrologer Abˆ Ma'shar (787-886), known in the West as Albumasar, were a major influence in the history of astrology in the Middle Ages, and the celestial images that accompanied his works made a huge impact on astronomical art. He was

born in Khurasan, died in al-Wasit, Iran, and traveled throughout the East; but lived and worked mainly in Baghdad. While studying in Baghdad, Abˆ Ma'shar became associated with the scholars at the caliphate court of al-Ma'mun [813-33] where the famous astrologer al-Kindi became his teacher. During his long life, Abˆ Ma'shar produced the seminal Arabic works on astrology. An important source of information on the illustrated manuscripts associated with Abˆ Ma'shar can be found in a dissertation by Vicky Clark written in 1979, still one of the few studies of his manuscripts in the West.[314] His astronomical/astrological texts and his mathematical calculations have been included in studies by historians of science and of astrology, as the astronomy of Arabic scholars has invited a number of current books, articles and conferences. But the study of the accompanying illustrations and their influence has not kept pace with the influx of new information and more accurate interpretions of his work. Another important study of the illustrations in the manuscripts of Abˆ Ma'shar was published in 1989 by Marie-Thérèse Gousset and J.-P.Verdet.[315]

Writings of Abˆ Ma'shar exerted a powerful influence on the development of astrological theory and practice in the West, where his reputation exceeded that in his own country.[316] Most of his treatises were not original creations, but were compiled from the accumulated astrological knowledge of earlier writers, with descriptions of the astronomical systems and especially in techniques for preparing and interpreting natal charts and for making

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[314] More accurately, the dissertation of Vicky Clark focuses on the "Abridged Version of Albumasar's *Greater Introduction* by Georgius Zothorus Zaparus Fendulus" which survives in seven manuscripts. Fendulus and his illuminations will be discussed in section 3.2.4.

[315] Gousset, Marie-Thérèse and J.-P.Verdet. *Liber Astrologiae,Georgius Zothoros Zaparus Fendulus*, Paris: Editions Herscher, 1989

[316] Clark 19

predictions.[317] His known works are: 1 *The Greater Introduction to Astronomy* (*Introductorium maius*), in eight books; 2 The *Flowers of Astrology (Flores Astrologicae)*, nine books; 3 *On the Great Conjunctions*, eight books; 4 On *Revolutions of Nativities*, ten books; 5 *The Thousands*,[318] eleven books; excerpts of his work appeared in his *Shorter Introduction to Astronomy*; all of these present his collected astrological system.[319] Abˆ Ma'shar's treatises were among the very first Arabic works to be translated into Latin in the twelfth century, mainly by John of Seville and Hermann of Carinthia. John's translation of the *Greater Introduction* was completed by 1133 and his version became known in Europe first, just before Hermann's translation, which followed shortly after in1140.

The impact of Abˆ Ma'shar's writings concerning philosophy and natural science on scholars of the twelfth and thirteenth centuries was profound, especially those teaching and studying at the 'school' of Chartres. Traces of his astronomical theories can be detected in the work of William of Conches, Bernard and Thierry of Chartres, Clarenbald of Arras, John of Salisbury and Daniel Morley. Abˆ Ma'shar's theories were also a consideration in the church's compromised attitude toward astrology as defined by Albertus Magnus and Thomas Aquinas.[320] Manuscripts of Abˆ Ma'shar's various treatises survive in both Arabic and Latin. Francis

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[317] Clark 20 Writings of Abˆ Ma'shar introduced a fusion of Hermeticism, Persian chronology, Islamic religious doctrine, Greek science and Mesopotamian astrology. He pulled together information from Hellenistic astrological writers such as Dorotheus and Vettius Valens, from Sanskrit astrological traditions, from Syriac and Neoplatonic philosophy of astral influences, he added theurgy from Al-Kindi and the books of the Harranians.

[318] See the *Thousands of Ab ˆ Ma'shar* by David E Pingree

[319] Abu-Ma'shar was composing both the *Ysagoge minor* and the *Introductorium maius* during the period when Aristotle's treatises were being translated from Greek into Arabic at the House of Wisdom. Consequently he absorbed the philosophical views of Aristotle along with his numerous other sources and many Aristotelian concepts found their way into his texts. For more information on this topic, see Richard Lemay, *Ab ˆ Ma'shar and Latin Aristotleianism in the Twelfth Century*, Beirut, 1962.

[320] Clark 27

Carmody states that there are almost fifty Arabic manuscripts known most of which have not been studied, including twelve copies of *The Greater Introduction*.[321] The two Latin translations of *The Greater Introduction* survive in great numbers as well, in diverse states of completeness, some are merely fragments. Carmody lists twenty-four copies of sizeable segments credited to John of Seville and nine copies of Hermann of Carinthia's version.[322] Although the Latin versions of *Greater Introduction* are illustrated, it seems that no companion illustrations appear in Eastern manuscripts.[323] The writings of Abˆ Ma'shar dominated the field of Arabic astronomy in the ninth century; the tenth century was similarly dominated by another important and long-lived astronomer commonly called Al-Sˆf′. His scientific writings too were illustrated with imaginative drawings that influenced Western astronomical manuscripts.

Abd al-Rahman al-Sˆf′: Life, Works and Illustrated Manuscripts

Al-Sˆf′ was born in Persia (903-986), near modern Tehran, and probably spent most of his life there, working under the patronage of the Iranian Buwayhid dynasty.[324] He composed numerous scientific treatises, not in his native language Persian but in Arabic, the universal language for scholars in Islamic countries at this time, just as Latin was for the Christian West.

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[321] Carmody 88

[322] Carmody 89-90 When examining John of Seville's translations, three are from the 13th century, four are 14th , five are 15th; the rest are not dated. Hermann's translations are generally earlier, four are from the 12th century, two are 13th century, the remaining are not dated. Herman's copy of Abu Mashar is ½ the length of John of Seville's because he removed much of the wordiness of the Arabic. According to Clark, p. 24, there are thirty-seven extant copies of John's Latin translation and eleven of Herman's. According to Lemay, there are forty of John's and ten of Hermann's.

[323] Clark 27

[324] An alternate form of al-Sˆf′'s name which goes back to a Spanish-Jewish scholar and astronomer is Azophi. This spelling appears on the famous stellar map of Albrecht Dürer published at Nuremberg in 1515. In the four corners are imaginative portraits of astronomers from four different cultures, who made contributions to the field, in the lower right corner is Azophi Arabus.

Al-Sˆf′ wrote astronomical, astrological and mathematical texts, including one on the celestial globe.[325] He also wrote a *zij*,[326] which does not survive, plus several treatises on the construction and use of the astrolabe.[327] The most outstanding work of al-Sˆf′, based mainly on Ptolemy, is his book on the constellations, in which he describes the forty-eight standard constellations, discussing each in general, and then citing the individual stars of each constellation. Al-Sˆf′ integrates material derived from Bedouin folk-astronomy, the constellation system of the '*Anwa*. He utilises both early Arabic stellar legacy and writings of Ptolemy; in so doing, he reconciles the two different traditions. He then enlivens the textual material with not one, but two mirror images of each constellation, one as it would appear on a celestial globe and the other as seen when actually looking at the night sky.[328] Lastly he includes a chart of the group of stars comprising that constellation, giving a verbal description of each star's correct location and its magnitude, latitude, and longitude adjusted to October 1, 964.[329] Al-Sˆf′ even mentions the

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[325] See E. Kennedy, "Al-Sˆf′ on the Celestial Globe" in *Astronomy and Astrology in the Medieval Islamic World*, pp 48-93. Reports survive that al-Sˆf′ actually made a celestial globe that was sold in Cairo in 1044

[326] A z′j was a compilation, including a new type of table in which celestial times and positions of sun, moon, planets and stars were tabulated. It also contained mathematical aids for their calculation, cannons, and commentaries. Since they were specific to time and place, many were produced throughout the Arab World. Their translation along with the use of the astrolabe gave European astronomers the means to make their own observations and calculations. Z′jes were influential in introducing the use of Arabic numerals to Europe, and in accurate star mapping.

[327] The huge numbers of decorated astrolabes were another source of astronomical images, basically unexplored by art historians, but beyond the confines of this study.

[328] This concept of dual interpretations was introduced in the discussion of celestial globes and will be mentioned further in Appendix C.

[329] Julio Samsó and Mercè Comes, "Al-Sˆf′ and Alfonso X" in *Islamic Astronomy in Medieval Spain*, p 69 Here he makes corrections to Ptolemy's charts to allow for precession, makes changes to the stars' magnitudes according to his own observations, and also adds many additional stars not included by Ptolemy. His correction for precession = 1 degree of longitude for every 66 years, but actually used 70 years at times.

reddish color of particular stars.[330]

Al-Sˆf′'s book on the constellations is of great importance in the history of science since it is a genuine Islamic contribution to the knowledge of the fixed stars. It also furnishes revisions for many of Ptolemy's dates, and is a serious attempt to collect and salvage numerous indigenous Arabic star names. Al-Sˆf′'s work was illustrated with eloquent miniatures of the constellation figures which were widely imitated, influencing the iconography of western star charts. Through its illustrations, his book has established a new standard for accuracy in representations of the constellations. It was also a veritable handbook for the fixed stars and the constellations, influential for many centuries, for both Arabic and European scholars.[331]

Like the *Aratea* manuscripts, al-Sˆf′ manuscripts have a complicated tradition. The treatise that survives in Latin manuscripts called, *Books on the Fixed Stars*, also called *Four Books on the Eighth Sphere*, has been credited to al-Sˆf′, but is not a true translation of his writings. It is actually a summary or a compilation of astronomical texts in which his work is the main ingredient. One of the compilations was made at the court of King Alfonso X, the main contact point from which al-Sˆf′'s work was introduced to the West. This Alfonsine compilation pretends to be, but is not strictly, a translation of al-Sˆf′.[332] The text summarizes a

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[330] Chabás and Goldstein 196 The writings of al-Sˆf′ on the colors of eclipses is discussed and traced to Hindu traditions that were transmitted by al-Sˆf′ and al-Khw~rizm′ and can be extended to the colors of stars.

[331] Kunitzsch 57

[332] Samsó 68 Spurred by his interest in astronomy and astrology, Alfonso sponsored a compilation of available material subsequently called the *Books on the Knowledge of Astronomy* in which al-Sˆf′'s catalog of stars was the fundamental text. A first draft of this Alfonsine version of al-Sˆf′'s treatise was carried out in 1256 by Yehudah b. Mosheh and Guillén Arremón Daspa, but since the first version was not regarded as satisfactory, it was revised by court astronomers in 1276. The prologue of this work maintains that Alfonso X himself made stylistic corrections to the text in Spanish, evidence that king was intimately involved in this revision Surprisingly the text of

good part of the data taken from al-Sˆf′, but it has been somewhat Christianized since this sensitive material might be considered suspicious; not only because it relied on Muslim sources, but also because it revolved around such dangerous topics as astronomy and astrology.[333]

Even before the translation and compilation of al-Sˆf′ treatises at the court of Alfonso X, an earlier European tradition developed around the writings of al-Sˆf′, called the *Sufi Latinus*. Like the Alfonsine version, these Latin manuscripts are a compilation of disparate astronomical and astrological material, only parts of which are really related to al-Sˆf′. The main component of this group of manuscripts is a star catalogue, accompanied by a series of drawings depicting each of the forty-eight constellations taken from al-Sˆf′'s double drawings of each constellation. The catalog of stars found in these manuscripts is actually Gerard of Cremona's Latin translation of the *Almagest* with the longitudes of the stars revised and brought up to date by al-Sˆf′. Constellation drawings that accompany the text in the *Sˆf′ Latinus*, that I have seen, are meticulous in showing the individual stars exactly as they appear in the sky, according to both number and placement of each individual star. Stars dominate each constellation and are numbered in order of their brightness; in addition the nearby stars that are not part of the constellations are acurately depicted as well. The relative sizes of the stars in the illustrations

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this compilation was not written in Latin, but in Spanish or to be more exact in Castilian. Many Arabic texts had been translated into Spanish and were practically unknown among European astronomers.

[333] The revised book departs from its exemplar with the addition of fresh material from the imagination of the Alfonsine author. The digressions rarely have any astronomical importance, but much art historical importance. The additions are mainly concerned with iconography, descriptions of the animals of the constellations, or with other aspects of everyday life. For instance the description of Aquarius which has 45 stars is quite brief, the description of Canis with only 2 stars, has a very long section on small dogs and their usefulness, talismanic magic, and astrology. See Gonzalo Menéndez Pidal, *La España del siglo XIII leida en imágenes*, Madrid, 1986.

indicate their magnitude. At present, eight manuscripts of the *Sufi Latinus* are known.[334]

Oxford, Bodleian Library Marsh 144

One of the oldest Arabic manuscripts of al-Sˆf′'s *Book of the Fixed Stars* is at Oxford, Marsh 144, composed and illustrated in 1009-1010, shortly after his death in 986. This copy containing 419 pages was composed on paper by an Arabic writer who says in the colophon that he is the son of the author. This outstanding codex was produced in Baghdad, but exhibits the adaptation of iconographic sources rooted in classical scientific manuscript traditions. The illustrations are handled with great care, Orientalized with characteristics of Sassinid art. "On the whole, the hybrid style, which was applied in a masterful and original way in the drawings of Marsh 144, includes many features reaching back not only to Western antiquity, but also to an earlier period of Oriental history."[335] The iconography of the illustrations was adapted from classical traditions of Late Antique manuscripts with some misunderstandings, such as the drawing of the head of Medusa, held by Perseus. When viewing this illustration in Marsh 144, Medusa with her snake-like hair becomes a demonic male with a stringy beard. Several of the intriguing miniatures from this manuscript can be seen among the images of constellations in Appendix C. The Bodleian al-Sˆf′ attests to the production of early astronomical illustrations and demonstrates its range and scope as well.

Paris, Bibliotheque de l'Arsenal MS 1036

The earliest extant Latin representative of the whole corpus of al-Sˆf′ manuscripts is held

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[334] Kunitzsch 1989, p. 117 The author lists the eight manuscripts of *al-Sˆf′ Latinus* which include the illustrations on p. 68. There is a later al-Sˆf′ book in the Spencer Collection, NY, Public Library dating to 1630.

[335] Emmy Wellesz, *An Islamic Book of Constellations*, Bodleian Library, Oxford, 1965, p. 6

in Paris, Arsenal MS 1036; it was produced in Bologna and dates to the third-quarter of the thirteenth century.[336] Textual evidence shows that this Arsenal manuscript could not have been the archetype of the *Sˆf′ Latinus* tradition, but is one of the later copies.[337] There are references to Sicily in several places in the manuscript, mentioning the years of the reign of William II (1166-1189), indicating that perhaps the model for this manuscript was compiled in Sicily around that time. This westernized version retains certain Islamic characteristics and contains a complete star catalog using the text of Gerard of Cremona's Latin translation.[338] Each constellation description is accompanied by an illustration of exceptional quality. The western composer of Arsenal MS 1036 was not consistent when planning the miniatures of al-Sˆf′'s two drawings for each constellation; he selected only one, varying between two opposite views. When examining the forty-eight constellation drawings, sixteen are rendered as seen on a celestial globe and thirty-two are shown as if seen looking at the sky. This manuscript is the closest of the surviving copies to al-Sˆf′'s original work and to Arabic material in general.[339] The dramatic illustrations are styled after those of Marsh 144, but synthesized and transfigured by the Italian artist into a Romanesque format. Another manuscript based on al-Sˆf′ is the thirteenth-century example, British Library MS Or 5323. This codex is an outstanding example of pen and ink drawings that display Persian techniques as well as double versions of each constellation. The translation of the

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[336] Paris, Bibliothèque de l'Arsenal, MS 1036 is included in Saxl and Meier, 1953, p. XXXII and in *Dix Siècles d'enluminure italienne*, Francois Avril, Bibliothèque Nationale, Paris, 1984, pp. 41-42

[337] Kunitzsch 76

[338] Carmody 94 As in other manuscripts based on the work of al-Sˆf′ , this one includes longitudes of stars that are rectified by al-Sˆf′'s empirical observations, as well as the magnitude of each star. Arsenal 1036 also contains John of Seville's translation of *De magnis coniunctionibus* by Abu Ma'shar.

[339] Kunitzsch 69 and 74

writings of al-Sˆf′ and other Arabic astronomers into Latin became a prime concern of western scholars as soon as they were available.

3.2.1 Translations of Astronomical Texts from Arabic by Latin Scholars: Adelard of Bath, Hermann of Carinthia, and Gerard of Cremona

Adelard of Bath

Adelard of Bath (ca.1080-1150) was one of the three most competent Latin translators who worked in the twelfth century, conveying the astronomical knowledge of the Arab World to the attention of European scholars. Adelard was a wandering scholar, skilled in mathematics and astronomy, his most famous student was King Henry II , to whom he dedicated his important treatise on the astrolabe.[340] What little is known about his life has been gathered from occasional personal comments inserted in his own writings, through his diverse interests and from local archives.[341] It is not known for certain where Adelard learned Arabic or did his translating, as he traveled to Antioch, Syria, Sicily and Italy; he began his career as translator with a difficult work, *Centiloquium Ptolemei*, 100 aphorisms to summarize the astrological theories of Ptolemy.[342] The *Isagoge minor* or *Shorter Introduction to Astronomy* of Abu Ma'shar was a much better

[340] A manuscript of this treatise suvives, *De opere astrolapsus*, Cambridge, Fitzwilliam Museum, McClean MS 165, see also Tester p. 43 for more information.

[341] Adelard studied at the cathedral 'schools' of Laon and Tours. Tours had a reputation for scholarship under bishop Berengar (d. 1088) who had been a student of Fulbert of Chartres.

[342] Cochrane 87 This translation was not completed, stopped with proposition 39, and is also poorly done for lack of understanding of both the Arabic and the astronomy. Lemay has shown that the *Centiloquium* was not actually written by Ptolemy, but is a forgery by Ahmed ibn Yusuf, an astrologer from Cairo, c. 920.

translation than his Ptolemy, completed around 1120; there are only two surviving manuscripts.[343] His third translation was the *Liber prestigiorum Thebidis*, a book on the theory of images by Th~bit b.Qurra. His later translations include Al-Khwarizmi's *Zij* and Euclid's *Elements*, which became a standard textbook for centuries.[344] His original treatise, *De opere astrolapsus*, written about 1150, opens with a dedication to the future Henry II. By this time, Adelard was already at the end of his career during which he was one of the scholars principally responsible for establishing Arabic astronomy in England.[345] There is little published on whether any of his astronomical writings or translations were illustrated. His translations have made little impact in the history of science, presently Hermann of Carinthia is a more respected scholar.

Hermann of Carinthia

Hermann of Carinthia, sometimes called Herman Dalmatin (ca.1100-1160), is largely known for his Arabic translations, but was also a philosopher, astronomer, astrologer and mathematician.[346] In his writings, he says that he was born in 'central Istria', but others say he was actually born on the island of Kor5ula, which is part of Croatia today. He was educated at a Benedictine monastic school in Istria and continued his studies in France, especially at Chartres during the scholarly era of Bernard and Thierry. It was probably during his stay in France that Hermann became interested in the classical texts that were reappearing through Arabic sources. He learned Arabic in his quest for recovering ancient knowledge and developed into a prolific

[343] Carmody 98 The two manuscripts surviving are: London BL Sloane 2030 and Oxford, Digby 68. Only the Oxford ms. is complete, not known if they are illustrated.

[344] Cochrane 85 He credits R. Lemay for revising the order of Adelard's translations.

[345] Burnett (1997) 38

[346] Not to be confused with an earlier Hermann, who also wrote on astronomical subjects, ie the astrolabe. This Hermann is called Contractus, the lame monk of Reichenau (1013-54).

translator, delving into a wide range of subject matters. The list of works translated by Hermann is impressive and though he lacks the originality of Adelard of Bath, he mastered a considerable part of the 'new mathematics and astronomy'.[347] Since he was entering difficult linguistic territory without guidelines or antecendents, at times his work seems confused, but his place among transmitters of Greek and Arabic science is highly esteemed.

Sometime before 1160, Hermann was in Sicily where he translated the *Almagest*.[348] He even dedicated the section of Ptolemy on the *Planispherium* to Thierry of Chartres.[349] As a former pupil of Thierry of Chartres, Hermann was acquainted with Adelard's translation of *Introductorium minor* by Abˆ Ma'shar, but he translated the longer version which was of more importance to European scholars. Hermann's translation of *Introductorium maius* later became the source of the first printed edition of Abu Ma'shar.[350] In addition to his translations of other authors, Hermann wrote his own treatise, *De essentiis*, which appeared in 1143; it too was dedicated to Thierry. His scholarly work demonstrated his knowledge of the Platonic tradition taught at the school of Chartres, as well as his familiarity with literature, the patristic fathers, and Arabic science. *De essentiis* was inspired with the theories of Aristotle from his writings on natural philosophy, but these ideas were not conceived directly from Aristotle; they were mostly derived from Abˆ Ma'shar. The major translators were most anxious to interpret the astrological theories of Abˆ Ma'shar. From the transmission of their translations, it is possible to develop a

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[347] Haskins 66

[348] Kunitzsch 116 Presently there is only one complete manuscript surviving (Vat.lat. 2056, 13th c.) and two fragmentary manuscripts.

[349] Haskins 47 *Studies in the History of Mediaeval Science*, Cambridge, 1924-27

[350] Lemay (1962) 3-9 Hermann's translation of Abˆ Ma'shar was even used by Gerard of Cremona in his public lectures on astrology in Toledo.

history of the evolution of the various concepts of celestial images and the entire field of astronomical art and imagination. One of the most unusual and little studied developments of celestial imagery is the appearance of the *paranatellonta* in manuscripts of Fendulus.

G**eorgius Zothorus Zaparus Fendulus**

A mysterious author named Georgius Z. Z. Fendulus is credited with writing an abridged version of Abˆ Ma'shar, a translation and interpretation inspired by *Flores astrologiae*, which is called the *Book of Astrology*. His identity and background is unknown, but scholars suggest that he may actually be Hermann of Carinthia himself. The words '*atque palatem*' appear after the name of Fendulus which may point to the court of Frederick II in the early thirteenth century. Seven manuscripts survive that are copies of abridged translation of the *Greater Introduction*, the earliest and most luxurious copy was made in southern Italy probably at the court of Frederick II.[351] In the incipit of the prologue of *Abridged Treatises*, Fendulus states that he translated the text from Persian to Latin; when in reality, Hermann's version translated in 1140 was used for the abridgement.[352] Fendulus' version of the *Greater Introduction* describes mainly constellations, planets, and their astrological influences; then these textual descriptions were transformed into the unique visual depictions that appeared initially in abridged versions. The illustrations of the *paranatellonta* allude to an expansion of astrological influences created from a combining of the

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[351] Clark 24 This manuscript is Paris BN Latin 7330, dating between 1220 and 1240. According to Saxl, this manuscript is not the original by Fendulus, but a copy of a 12th century model. Saxl feels 'that the constellations betray an earlier source while the planets reflect a later trend initiated by Michael Scot'. In addition to Clark's study of the Fendulus manuscripts, BN Lat. 7330 is included in Saxl and Meier, 1953, II, p.LII-LXVIII, Fig. 31, 33; and in *Dix Siècles d'enluminure italienne*, Francois Avril, Bibliothèque Nationale, Paris, 1984, pp. 51-52.

[352] Clark 24-32 All seven manuscripts are discussed by Clark. For more information on BN lat. 7330 see *Manuscrits Enluminés de la Bibliothèque Nationale, Manuscrits D'Origine Italienne II, XIII Siècle*, F. Avril et M-T. Gousset, Paris 1984 and also *Liber Astrologiae*, M-T. Gousset and J-P. Verdet.

astrological systems of India, Egypt, Persia, and Greece. This expanded reading of astrological significators adds the decans and stars that rise on either side of the zodical constellations. These illustrations are faithful to the text and show a part of a leg, arm or animal. The Fendulus manuscripts contain a brief introductory text that describes the twelve Signs of the Zodiac, but are essentially elaborate picture books with two full-page portraits, one of Abu Ma'shur and one of Fendulus himself. Because of the inclusion of the concept of decans and *paranatellonta*, Fendulus manuscripts seem to be modeled on a completely different tradition than al-Sufi manuscripts.

Gerard of Cremona

The third and most prolific translator of the twelfth century who concentrated on making astronomical information available to the Latin West was Gerard of Cremona (c 1114-1178). Gerard arrived in Toledo around 1160, purposefully since he could not find a Latin translation of Ptolemy in Italy. There Gerard learned Arabic, mainly in order to recover and translate Ptolemy's *Almagest*, which he completed in 1175, his first Latin translation.[353] While he was in Toledo, Gerard completed over eighty translations in a variety of scientific disciplines, in fact more Arabic science passed through his hands than any others.[354] While there he was appointed to the position of *diácono* in 1162; he held the post until he died in 1178. This advantageous position as deacon supplied him an income and allowed him access to the scholarly works he was anxious to

[353] Haskins 104 Gerard was not the first to translate the *Almagest* into Latin. It was translated from Greek into Latin in Sicily about 1160.

[354] Bosch 37 In addition to the work of Ptolemy, Gerard translated Galen and most of Aristotle's philosophical works, as well as Arabic authors; al-Kindi, al-Gazzali, al-Fargani, and al-Farabí. He probably worked with a team of assistants.

translate.[355] Gerard's translation of the *Almagest* became the standard version used throughout Western Europe until the fifteenth century when Greek texts of classical works were again available.[356] About fifty Latin manuscripts of Gerard's translation of the *Almagest* are extant, of these thirty-five are complete, most probably not illustrated.[357] Gerard's Latin translation of the *Almagest* was printed in Venice in 1515.

3.3 ILLUSTRATED ASTRONOMICAL TEXTS IN THE THIRTEENTH CENTURY

Educational reforms took place in the Latin West after the awakening of the twelfth century and the influx of the tremendous volume of 'new' information from Greek and Arabic sources. Latin translators brought a theoretical basis of astronomy to Western scholars replacing the mere descriptions of the liberal arts. The discipline of astronomy had accumulated vast amounts of knowledge and calculating techniques, but Christian astronomers were slow to integrate the newly-discovered information with their long-established religious doctrines. In the thirteenth century, a new series of treatises filled with rudimentary knowledge on the technical aspects of astronomy with the generic title of *De sphaera* circulated in recently-founded universities at Paris, Oxford and Bologna. These texts were accompanied by explanatory

[355] Gerard's translation of al-Kindi survives in thirteen manuscripts - see Francis J. Carmody, *Arabic Astronomical and Astrological Sciences in Latin Translation, a critical bibliography* (1956). Robert of Chester also translated al-Kindi, of which ten manuscripts are extant. It is interesting to note that ten manuscripts of the two translators are at Oxford.

[356] Haskins 120 One of Gerard's working associates was a younger scholar, Robert of Chester. While in Ebro, Spain, they were commisssioned by Peter the Venerable to translate the Koran into Latin, which they finished in 1143. Gerard dedicated his own work, *De essentiis* to Robert in 1143.

[357] Kunitzsch (1989) 117

diagrams, but did not include mythological material nor the illustrated constellation cycles of the *Aratea*. The most popular version of these treatises was *De sphaera* composed by Sacrobosco.

Sacrobosco and *De sphaera*

The thirteenth-century astronomical treatise *De sphaera* by Johannes Sacrobosco, an English scholar and astronomer, was one of the most influential and widely used textbooks until it became outmoded in the seventeenth century. John of Sacrobosco (ca.1195-1244), was educated at Oxford and taught at the University of Paris, where by 1250 his *De sphaera* became required reading for all university students. But his was an elementary work on basic celestial phenomena, the rising and setting of the stars and planets, the Zodiac, the spherical Earth, the climate, and the Sun's path through the ecliptic. His *De sphaera* was based mainly on Ptolemy's *Almagest* in a 'watered down', less mathematical version with almost no planetary theory. Sacrobosco's writings are commonly embellished with astronomical diagrams that helped clarify the descriptions of solar, lunar and planetary motions. Hundreds of manuscripts of Sacrobosco's *De sphaera* survive and over seventy early printed editions attest to its great popularity.[358] One of the earliest extant copies of the Latin treatise of Sacrobosco, dated to around 1260, is at the New York Public Library.[359] The astronomical material in NYPL MA 69 is presented as simply as possible for students, and is further elucidated with illuminated diagrams. The Earth-centered diagram demonstrates the astronomy of Ptolemy with the planets moving on epicycles, the Signs of the Zodiac are painted around the perimeter. The Morgan Library also holds a fifteenth century

[358] McCluskey (1998) 196 See also L. Thorndike, *Sphere of Sacrobosco and Its Commentators*, Chicago: University of Chicago Press, 1949; and O. Pedersen, "In Quest of Sacrobosco", *Journal for the History of Astronomy*, 16 (1985) pp.190-92

[359] Alexander, et al (2005) 331-2 The NYPL manuscript was made in Paris ca. 1262.

humanistic manuscript of Sacrobosco and fragments of another.[360]

Progress in the advancement of astronomical knowledge proceeded fitfully through the later Middle Ages. The masters of the new universities gradually assimilated advanced astronomical knowledge into the European intellectural tradition. The newly-acquired knowledge was applied to traditional astronomical problems, and then scholars taught, wrote and questioned the cosmological implications. More highly-developed astronomical texts were introduced after the writings of Roger Bacon, Albertus Magnus, Grossteste and other great thinkers had been analyzed and digested. Theories of al-Bitrûjî were influential and these scholars made extensive use of his writings in their studies. Aristotle, along with his commentators Averroës and Avicenna, was studied, thrown out, and then reworked to fit Christian ideology. The simplistic type of astronomical information and fanciful illustrations found in *Aratea* manuscripts had no place in this heady company, as thirteenth and fourteenth century astronomers were interested in recent discoveries such as the 'proper movement of the sun's apogee'. Technical, theoretical astronomy with its advanced spherical diagrams had replaced the mythical tales and symbolic stories of the constellations and planets in the writings of Macrobius, Martianus Capella and Aratus and the fanciful images of the *Aratea*. But rather than becoming lost and forgotten in the torrent of intellectual advancement as one would expect, the ancient gods, goddesses, planetary figures, and luminaries of the constellations re-emerge in the next century dominating the iconography espoused by the wealthy courts of Europe. Royal courts patronized artists,

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[360] *Italian Manuscripts in the Pierpont Morgan Library,* The Morgan Library holds a Sacrobosco manuscript M.426, made in Italy, *Sphaera Mundi*, written in Italian, third quarter of the fifteenth century. M.426 has four astronomical marginal illustrations, p 50. The Morgan also has a fragment of *de Sphaera*, a 15th century copy made in Austria with a colorful diagram of the heavens, M.722, f. 18.

musicians, scholars and astronomers, but were especially fascinated with the resurgence of the ancient art of astrology. Astrological theories began to influence the activities and daily life of the courts; and astrological and cosmological artistic programs decorated their regal residences. *Aratea* manuscripts not only survived the challenges of time and change, but actually reached their peak production in the fifteenth century.

3.4 ASTRONOMICAL ILLUSTRATIONS AT THE COURT OF FREDERICK II AND MICHAEL SCOT

Sicily was one of the first sites where the developing scientific knowledge was encouraged and incorporated by the court of Frederick II (1197-1250). His court was one of the most brillliant in Europe, a center of culture, poetry, natural sciences and mathematics, and Frederick was one of the most enlightened and respected medieval monarchs, who played a central role in the intellectural activities that transpired there. Sicily, like Toledo, became a meeting point where Arabic, Jewish and Christian scholars worked together to translate and reproduce the important scientific texts.[361] A courtly 'school' emerged that produced illuminated manuscripts of high quality. The most prominent representation from the court 'school', the 'Treatise on Falconry', entitled *De arte venandi cum avibus*, was written by Frederick II himself for his son Manfred. The manuscripts produced in this royal court (both Sicily and Naples have been proposed as its actual

[361] Haskins 244 Even before Frederick II came to power, his immediate successors, William I and William II promoted scientific activity and the translation of Greek treatises on mathematics and astronomy.

location) have a new and spontaneous element with elegant miniatures painted with somber and delicate shades. The manuscripts associated with Michael Scot are manifestations of this courtly style.

The colorful and enigmatic Michael Scot became the dominate figure among Frederick's scholars, even though his career at the royal court in Sicily in the1220's lasted for only about four years.[362] He was active at Bologna in 1220, probably under the patronage of Frederick II's court there.[363] Multi-talented, he came to the charismatic Emperor as a translator of Arabic treatises, a doctor, astronomer, alchemist and astrologer. Michael had actually spent much of his scholarly career translating in Spain; he was working in Toledo, where, like Gerard of Cremona, he acted as deacon at the Cathedral. Between 1217 and1220, he translated Aristotle's *De animalibus* and al-Bitrûjî's *De caelo* and *De motibus celorum*.[364] Carmody's edition lists thirteen surviving manuscripts of Michael Scott's translation of *De motibus celorum*. Some are accompanied with mathematical diagrams, but since al-Bitrûjî is concerned with theoretical not popular astronomy, there is no account of the constellations and no illustrations in this group.

Michael also translated writings of Abu Ma'shur as well as the philosophical commentary

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[362] Michael was born in the British Isles and moved in papal circles under Honorius III and Gregory IX. He turned down a benefice in Ireland, as he knew no Irish.

[363] Frederick II was the first European ruler to deliberately found a university, the University of Naples in 1224.

[364] For information on Michael Scot's translation of Al-Bitruji see. *De Motibus Celorum: Critical Edition of the Latin Translation of Michael Scot*, ed. Francis J. Carmody, U of CA Press, 1952. Al-Bitrûjî lived in Spain and wrote in the early thirteenth century; his works were among the latest by Arabic astronomers to reach Western scholars. His works were translated into Latin soon after they were written; he became famous after 1220, when Michael Scot's translation became one of the standard source texts used by many serious authors. In his writings, al-Bitruji includes metaphysical principles, time, velocity of movements, precession, and spherical geometry; and is known for his interpretation of Aristotelian axioms.

on Aristotle's *De caelo* by Ibn Rushd.[365] Michaels's writings on astrology were the basis of his literary fame in the Middle Ages; his scientific writings indicate a knowledge of medicine, natural philosophy and music.[366] In addition to his many translations, Scot composed some original works such as *De divisione philosophia* and *Liber introductorius*, both written before 1228, and both dedicated to the Emperor. *Liber introductorius* is his most ambitious book; written for beginners, the early portions are concerned with astronomy; then lead to astrology.[367] The illustrations of the constellation cycle appear in a surviving manuscript in Munich, and in its copy at Oxford, and a copy at Paris. Haskins reports, "...the remarkable figures of the constellations and planets in the Munich and Oxford manuscripts represent an antique tradition which is ascribed by Boll to the scholia of Germanicus".[368] Michael Scot died around 1236 after being struck by crumbling masonry in a church.

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[365] Haskins 283 "Scot's translations were the occasion of unfavorable judgements on the part of Roder Bacon, who declared that Scot did not really know the languages or the sciences, and that the work was chiefly done by a Jew named Andrew". Michael did not seem to know any Greek. (Ibn Rushd is aka Averroës).

[366] Haskins 285

[367] Illustrated copies are: Munich, cod.lat. 10268 (15th c.); Oxford, MS. Bodley 266, which is a copy of Munich; Paris BN, Nouv. acq. 1401 (c 1279); none have all four parts. Haskins lists nine more manuscripts which have fragments, only one has illustrations, Seville, Colombina, MS. 7.7.1. (15th c.).

[368] Haskins 288 He cites Boll's *Sphäera* p. 441

3.5 ASTRONOMICAL ILLUSTRATIONS AT THE COURT OF ALPHONSO X, THE WISE

The close-knit association of the royal courts of Europe with astronomical knowledge and its symbolism reached a high point in Spain during the thirteenth century with the patronage of Alfonso X, king of Castile and León for over thirty years (1252-1284). Alfonso was widely renowned as a poet, a patron of music and arts, and as a distinguished lawmaker; rewarded in his own time with the title, *el Sabio*. Alfonso went far beyond the role of royal patron, but actively participated in many of the cultural enterprises that he sponsored. He himself was a scholar, even revising the work of his collaborators.[369] In the late Middle Ages and Renaissance, Alfonso was recognized and respected primarily as the producer of the influential astronomical tables, which bear his name.[370] Even previous to the compilation of the Alphonsine Tables (1263-1276), Alfonso had sponsored various astronomical studies which were carried out by his two Jewish collaborators, Judah ben Moses ha-Cohen and Isaac ben Sid; and it seems clear that Alfonsine scholars used Arabic astronomical sources credited to Spanish-Arabic authors.[371] Christian writers enjoyed easy access to the corpus of Arabic scientific material that had attained its highest scientific level in Muslim Spain in the eleventh century.[372] The richness of reliable sources plus the encouragement of royal patronage enabled scholars to produce a large body of astronomical

[369] Chabás and Goldstein 225

370 Chabás and Goldstein 230 "In contrast, the translations and original works in literary, legal, and historical genres have largely been forgotten except by specialists."

371 Bossong 13

372 Chabás and Goldstein 1 Alfonso's father, Ferdinand III, had conquered much of Muslim territory, including the important learning centers, Seville and Córdoba. Alfonso relied on Christian scholars and Jewish intellectuals who were familiar with Arabic to translate their astronomical works into Castilian.

works which were partly Castilian translations of writings by earlier Arabic astronomers, but also included some original and advanced work.

Like Charlemagne and other imperial patrons, Alfonso X gathered to his court at Toledo the foremost scholars of his day; mathematicians, physicians, technicians, astronomers, and astrologers.[373] In the manner of Frederick II, Alfonso embraced the best Arabic, Jewish and Christian scholars, who worked together and created a group of writings that were of great importance for various branches of the history of science. The writings that were produced were related to astronomy: instruments, clocks, tables, cosmography, star catalogues, and astrology.[374] Court scholars had vast resources at hand, not only Ptolemy's major astronomical treatise, the *Almagest*, which had been translated into Latin in Toledo by Gerard of Cremona in 1175; but they also had numerous Arabic astronomical and astrological works for references. The Christian and Jewish scholars assembled by Alfonso, using Arabic writings, composed a collection of monographs on astronomy, on various astronomical instruments, and other related texts which were assembled into a large handbook known as *Libros del saber de astrologia*.[375]

The Alfonsine Tables

King Alfonso X was the driving force that resulted in the publication of the Alphonsine Tables, which were considered, 'the most important astronomical charts of the Middle Ages'. Yet

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373 Toledo's association with astrology looks back to antiquity with one of its founding legends. The ancient myths credit the birth of the city to "Ferecio, a Greek astrologer, who came to Spain with Teucer, Ulysses, and Diomedes after the siege of Troy. He later consecrated the city to Heracles. Ferecio taught magic and astrology to the inhabitants: hence the appellation arte Toledano, used to refer to the occult arts practiced in Spain." Bosch 23

374 Chabás and Goldstein 2 "The astronomers worked for a secular court led by the king and they had no known connection to such educational instirutions as the recently founded University of Salamance, extablished ca. 1228 by King Ferdinand III of Castile."

375 Kunitzsch (1989) 64

modern scholarship has lately determined that Alfonso X was not in fact the author of these tables, although he was greatly involved in their production, his main function was as patron not creator. The Alfonsine Tables were a set of astronomical tables designed to show the chronology of the Sun, Moon, stars and planets, accompanied by explanatory introduction chapters. The Tables also contains a star catalog, which was basically Ptolemy's star chart from the *Almagest*, in the wording of Gerard of Cremona. This entire arrangement of material was based on the Arabic-Islamic z′jes. Although Alfonsine scholars relied on Arabic precedents and used Arabic sources, these tables can be considered the first European attempt to develop original research in astronomy.

Surprisingly the original Alfonsine Tables were written in Castilian, not Latin. Previous to this innovation, all scholarly and religious matters were expressed in the exclusive domain of the prestigious language, which of course was Latin in medieval Christian Europe. Until the second half of the thirteenth century, it would have been inconceivable to compose a manuscript on legal, philosophical or scientific matters in a Romance vernacular rather than Latin.[376] This began to change around 1250, but not in a consistent manner. In Spain this change to the local language took place at a very early date. Under Alfonso, scientific thought appeared for the first time in a Romance vernacular, and scholarly treatises began to be written in Spanish/Castilian only a few years after his accession to the throne. Because of the language consideration, the Castilian astronomical corpus was not widely circulated, and it inspired no major influence outside Spain in the Middle Ages. However a Latin version of the Alfonsine Tables was put together in Paris in

[376] Bossong 13 "Until the thirteenth century, the Romance languages were confined to the inferior status of oral vernaculars, they served for literary purposes, especially for poetry."

the late 1320's and copies of this spread throughout Europe. Shortly after they were compiled in Paris, these revised Latin Tables, still credited to Alphonso, rapidly replaced the earlier Toledan Tables [377], and became the most influential handbook of practical astronomy until the late 16th century.[378] Most references to the Alfonsine Tables in astronomical literature pertain to this later Latin version. The first verification that the Parisian Alfonsine Tables arrived back in Spain is found in Madrid, BN MS 4238.[379] No official census of the surviving manuscripts has be undertaken, but it is thought that at least several hundred copies of the Tables were made. In the later years of his reign, Alphonso returned to the older practice of publishing scientific works in Latin, in order to reach the attention of scholars throughout Europe.[380]

The Alfonsine Z′j does not include a description of the constellations, therefore the cycle of constellation illustrations would not be expected or found in the Alfonsine Tables. Although the Tables are concerned with the constellations, particularly the Signs of the Zodiac, it seems quite possible that their importance was related to astrology and magic. One of the chief reasons that motivated the king to order the preparation of an adequate star catalogue was astrological. Alsonso was greatly concerned with astrology and also had a great interest in talismanic magic,

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[377] Chabás and Goldstein 5 The *Toledan Tables* had been assembled in al-Andalus by S~ ‘id al-Andalus′ and his circle, using the Muslim calendar, and were translated into Latin in the twelfth century. The authors also trace the probable source for the appearance of the *Alfonsine Tables* in Paris in the early 14th century, pp. 245-47.

[378] Bossong 14 “Besides that, we have to wait more than a century before we find an astronomical treatise in English: Geoffrey Chaucer’s famous *Treastise on the Astrolabe* was composed in 1391. He justifies his use of English since he is addressing his little son who still does not know enough Latin.”

[379] Chabás and Goldstein 292 “In contrast to the vast number of copies in libraries elsewhere in Europe, only a few manuscripts containing the Parisian version of the Alfonsine Tables have been preserved in Spanish collections.”

[380] Bossong 16

which was associated with the preparation of astrological images.[381] Surviving law codes show mixed feelings toward astrology and magic of that era. In one of the legal codes promoted by Alfonso, the *Partidas*, mandates that those who employ magic for mischievous purposes are to suffer the death penalty, but those who use magical forces with good intentions and achieve beneficial results are to be highly praised.[382] King Alfonso X and his patronage were important factors in the history of astronomy, and he too has been immortalized by modern astronomers as a lunar crater bears his name.

3.6 ASTRONOMICAL ILLUSTRATIONS AT THE COURT OF HENRY VII

Although not a dynamic scholar in the mode of Frederick II or Alphonso X, Henry VII (1457-1509) has been long recognized as the first English king known to have had a formal library and librarian, holding manuscripts that he bought, collected and commissioned.[383] The fifteenth-century court of England's first Tudor king had international tastes and global interests. Humanist scholars were brought to court to teach his children and to write England's history. Henry 'took great delight' in having books read to him, letting someone else to do the work of

[381] Samsó 72

[382] Samsó 72 The manuscripts concerned with talismanic magic are called the *lapidarios* and may contain illustrations of the constellations.

[383] Scott 365 "In recognition of the technical and artistic demands required to produce this book and of the influence of Henry VII, this book was chosen to conclude the *Survey* of later Gothic manuscripts."

actually deciphering the letters.[384] Although considered parsimonious, Henry enjoyed sumptuous manuscripts; and he imported art works, furniture and books, along with a court astronomer/astrologer from Italy.

Doctor, astronomer, astrologer William Parron, a native of Piacenza, arrived in England around 1487, and for fifteen years provided astrological and medical counseling for court patrons. He succeeded in establishing himself at the court of Henry VII and produced several books with general predictions.[385] The career of England's first royal astrologer came to an inglorious end, and he quietly disappeared from view after he predicted a long life of eighty years for the Queen, Elizabeth of York. She died a few months later, when only thirty seven.

A richly decorated and gilded illuminated astronomical manuscript, British Library, MS Arundel 66, was produced under the patronage of the King in 1490, when Parron was engaged as court astrologer, but it is not known what part he may have played in its creation. The manuscript is a compilation of astronomical canons and tables based on the Alfonsine Tables, treatises on the heavens, nativity charts and a fully-illustrated constellation cycle. The constellation drawings were made by one of three artists who worked on the manuscript, the least talented one. Scott relates that the "work is naive in the extreme and unexpected in a book of this quality".[386] Forty-five constellations are crudely-executed minatures, each in a similar manner, framed with a patterned background in red and gold, the figures and animals appear awkward and ill-

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[384] Carley 41 King Henry VIII inherited many manuscripts owned by his father, Henry VII, and he too had a court astronomer and astrologer named Nicholas Kratzer. Kratzer wrote a short astronomical treastise, *Canones horoptri*, that he dedicated to the king. (56)

[385] Three decorated copies of astrological works were presented to the King by Parron. See C.A. Armstrong, *Italian Renaissance Studies; A Tribute to the late C.M. Ady*, ed. E.F. Jacob, 1960 (432-54)

[386] Scott 366

proportioned. The text into which the illuminations are set is not the usual classical descriptions of Hyginus, the *Aratea*, or Psuedo-Bede, but a combination of charts and astrological interpretations. The constellation picture cycle remains the same, but has been adapted from astronomical to astrological purposes. This royal astronomical manuscript was created toward the end of the fifteenth century, as the final era of handwritten and hand-painted productions made way for the age of printing. The royal courts were still concerned with commissioning religious manuscripts, but often displayed a matching interest in astronomical matters.

In summary the transmission of astronomical knowledge through the Middle Ages is a huge, complicated topic and cannot be covered in its entirety in this study. This overview of the most common medieval astronomical manuscript traditions is far from comprehensive; it merely sets forth the primary candidates in the transmission of astronomical knowledge. The compilations of Macrobius, Martianus Capella, and Isidore served to transmit the remnants of ancient science without any growth in originality or creativity. The writings of Bede show the participation and addition of his observations of natural phenomena, but his astronomical research was mainly directed toward the study of computus. As we have seen, from Late Antiquity until the twelfth century, there was little advancement in the body of astronomical knowledge held in the West. But by the thirteenth century, a new science of the stars had been instituted along with a new scientific curiousity about the nature of the heavens. After the influx of Arabic astronomy, a person was not considered learned if they did not know basic astronomical principles along with the arcane secrets and practice of astrology. The impact of astronomical advancements made by Arabic scholars cannot be exaggerated and its art historical significance requires further study.

This chapter investigated the various transmission streams for 'popular' astronomical knowledge that appeared along with the *Aratea* in the Middle Ages. Each author and their writings were examined for content and for survival of their treatises and also to determine if they were illustrated. By looking at the circulation and surviving numbers of manuscripts of these other authors, it was possible to gauge the influence of the various manuscript traditions. Gathering this information was laborious and time-consuming as not one of the authors of astronomical material has been well-studied by art historians. Looking back at Pliny, large numbers of his manuscripts survive and his writings include reliable astronomical material, but do not seem to contain the constellation cycle, although his works were noted for their many explanatory diagrams. The writings of Macrobius and Martianus Capella were quite popular for transmitting elementary information, but few are illustrated. More often the illustrations are devoted to personifications of the seven liberal arts, not the cycle of constellations. Their writings also include cosmological diagrams and celestial and terrestial maps. Enormous numbers of Isidore's manuscripts survive, many accompanied by diagrams, but they warrant a separate study as well to determine if or how they were illustrated.

Other astronomical manuscript traditions that were abundantly illustrated were limited to Hyginus and Pseudo-Bede. The Ps-Bede compositions, called *De signis coeli*, are 'watered down' versions of Bede, but they are often illustrated with the full constellation cycle. The textual material is quite abbreviated, usually just a sentence or two, and the illustrations are placed five or six to a page. Hyginus' *De astronomia* was a very important illustrated manuscript tradition. Without much directed effort, I have accumulated a list of fifty-five surviving Hyginus

manuscripts having wide distribution, with the greatest concentration appearing in Italy where there are at least eighteen, and in England which has fifteen. Most of the Hyginus manuscripts are illuminated; many that I have seen have elegant, sophisticated appearances. The clothing is more 'stylish' with soft coloring compared to artwork in typical Aratean miniatures where the human figures, more often than not, appear naked. Many *Aratea* manuscripts are bound with the writings of Hyginus, some even include a picture cycle for each author. The Hyginus manuscript tradition is calling for study, since there is even less published on this group than on the *Aratea*.

This section also discussed the manuscript traditions of the Arabic authors along with their illustrations, mainly Abu Ma'shar and Al-Sˆf′. It explained the Latin translators of the Arabic treatises and their respective manuscript survivals that introduced Arabic astrological art to the Latin West. The astronomical manuscripts created in some royal courts of Europe were briefly introduced. By bringing together all of these components, although far from comprehensive, one can appreciate the complicated and varied paths for the transmission of astronomical knowledge during the medieval period. This segment has presented a broad view of the various manuscript traditions. Chapter 4 takes a narrower view and examines in more detail the production of *Aratea* manuscripts along with their cultural circumstances in order to determine their proper role in this vast astronomical tradition.

4.0 SURVEY OF SURVIVING ARATEA MANUSCRIPTS

This chapter looks more closely at the body of extant Latin *Aratea* manuscripts, with two goals in mind. Initially it will take a more general approach surveying the total group of illustrated *Aratea* manuscripts, probably not an exhaustive study since there may be a few surviving manuscripts that I have not found, but as thorough as possible. The overview will look at the numbers, dates, and places of productions of surviving *Aratea* manuscripts. Part A also presents the historic cultural circumstances surrounding the *Aratea* manuscripts' production. Part B will focus in more detail on six exemplary *Aratea* manuscripts for particular consideration.[387] These six representative examples, from three significant time periods, have been singled out for special consideration. The particular historical time periods are the ninth, twelfth and fifteenth centuries, chosen because these eras stand out as exceptional for their progress in 'science', more

387 For this section of the study, I have consulted: Saxl and Meier. Verzeichnis astrologischer und mythologischer illllustrierter Handschriften des latinischen mittelalters, 4 parts: for Cicero, Cicéron: Aratea Fragments Poètiques, ed. Jean Soubiran, Paris: 1972; Pächt Otto and J. J. G. Alexander. Illuminated Manuscripts in the Bodleian Library, Oxford. 3 vols. Pierpont Morgan Library, Italian Manuscripts in the Pierpont Morgan Library: Descriptive Survey of the Principal Illuminated Manuscripts of the Sixth to Sixteenth Centuries; McGurk et al. *An Eleventh-Century Anglo-Saxon Illustrated Miscellany: British Library, Cotton Tiberius B.V. Part 1*; Germanicus. *Aratea, Kommentar zum Aratus des Germanicus, MS. Voss. Lat. Q.79* Bibliotheek der Rijksuniversiteit Leiden, Faksimile Edition and Commentary, 2 volumes, B. Bischoff, B. Eastwood, T.A.-P. Klein, F. Mütherich and P.F.J. Obbema; Pellegrin, Elisabeth et al. *Les Manuscrits Classiques Latins de la Bibliotèque Vaticane*, Tome 1, Buonocore, Marco. *Vedere i Classici*: L'illustrazione libraria dei testi antichi dall'erà romana al tardo medioevo; M. Mariana, *Codex de Metz 3307, Tratado de computo Y Astronomia*, Estudio Critico, Testimonio Compania Editorial, Madrid (1993)

properly called ‘natural philosophy’. These centuries were noted for their advancements in astronomy and importance in the transmission of astronomical knowledge. I have chosen these six manuscripts for a variety of reasons. In the case of the ninth-century examples, the two subjects are considered among the most important *Aratea*, as they retain the qualities of their antique prototypes and served as models, influencing the Aratean art that followed them. The twelfth-century manuscripts were chosen for availability and access in the viewing the illustrations. The two fifteenth-century examples were chosen since they were part of a group of four made at the same time in the same place, and would provide fruitful comparisons. I have examined all six manuscripts, either firsthand or on microfilm.

4.1 GENERAL DISCUSSION OF ARATEA MANUSCRIPTS

A select few of the sixty extant *Aratea* manuscripts have received a great deal of attention from art historians and text scholars, but the majority have received very little notice in art historical literature. The entire Aratean tradition has not been studied as a body of illustrated manuscripts, for its poetic content or for its rich illuminations. No other classical writings have received such attention from medieval book producers. Two Late Antique illustrated manuscripts of Virgil survive, but they were not copied. Nor were the works of Homer, Hesiod, Ovid, or Pliny illustrated and circulated in great numbers, excepts for bits here and there. Although I have only seen about half of the *Aratea* firsthand, I am overwhelmed with the enormity of the body of manuscripts, possibly there are still more that I have not encountered. Most versions of the *Aratea*

do not stand alone, but are included in astronomical anthologies. Within these collections, often a few diagrams appear, but the *Aratea* is the only portion that is fully illustrated. The quality of the body of manuscripts varies greatly; some of the illuminations are richly painted by expert artists, but many are repetitious, sketchy and poorly executed by less skilled craftsmen. None of the later manuscripts match the caliber and artistry of those produced in the Carolingian era.

Numbers of Surviving *Aratea* Manuscripts

An enormous number of decorated Bibles, Books of Hours and liturgical codices survive from the Middle Ages; and for the most part, the higher the quality of a manuscript, the better are its chances for survival. In spite of the dominant focus on Christianity and religious texts in the medieval period, this pagan poem, with its cast of non-Christian characters from mythic tales, has survived Christianity, and continued to be reproduced over and over. It is remarkable that such a large number of *Aratea* manuscripts are extant since very few were luxurious books enhanced with gold or silver accents, nor were they illuminated by famous artists or workshops, and they probably received much use. The majority of the *Aratea* manuscripts, that I have seen, include miniatures that were illustrated with modest effort, adding lightly-colored line drawings without elaborate or expensive paints. A facsimile has been published for at least three outstanding *Aratea*: Leiden Voss.lat. Q.79; Madrid BN Codex de Metz 3307; and London BL Cotton MS Tiberius B.V. Only a select few *Aratea* manuscripts have been studied in any detail. The surviving manuscripts in general, form into two general groups: an English component and the European group which extended to Italy where it blossomed in the fifteenth century. The following is a breakdown of extant *Aratea* by centuries:

Ninth century - thirteen
Tenth century - seven
Eleventh century - seven
Twelfth century - four
Thirteenth century - two
Fourteenth century - three
Fifteenth century - twenty six

Dates and Places of Manuscript Production

The earliest *Aratea* manuscripts date to the ninth century, which is the case for most surviving classical literature. Credit Charlemagne and his successors for ordering the preservation of ancient poetry, mythology, science and literature. The Carolingians must have produced numerous Aratean manuscripts, since a surprising number, thirteen, are extant from the ninth century; but two are not illustrated.[388] The most familiar Carolingian production centers were the Palace Schools of Charlemagne and of Charles the Bald and location at Soissons, Rheims, Tours, Metz, Lorsch, and St. Gall, but it is difficult to identify with certainty the manuscript with its place of production. From the Carolingian palace and monastic scriptoria, the numerous *Aratea* manuscripts spread out to libraries and other centers where the early versions were copied. A large number of copies of Cicero's *Aratea* were produced in England and Germanicus' *Aratea* circulated and was copied in France and Germany/Austria. A branch of the Germanicus version was traced to Montecassino in the twelfth century, which then circulated through learning centers in Italy. Spain does not seem to have participated in the transmission of *Aratea* manuscripts, the five codices currently held in Spanish libraries were all made elsewhere.

Cicero, Germanicus, and Avienus Texts

The examination of the textual tradition of the *Aratea* manuscripts is not the particular

[388] The thirteen *Aratea* manuscripts from the ninth-century are discussed in section 4.4.1. The *Aratea* with Avienus text in Vienna, Codex Vindobonensis Palatinus 107 and Paris, BNF Lat. 7886 are not illustrated.

focus of this dissertation as it is extremely complicated, and has been studied by Classical text scholars.[389] But of the extant manuscripts, the text of Germanicus out numbers that of the other two by far.[390] A brief explanation of the variety of *Aratea* texts associated with the cycle of astronomical illustrations is required to understand the tradition; for a more in-depth examination of the various textual presentations, consult their scholarly publications. A further explanation of the poetic texts in conjunction with their images is included in Appendix B.

In addition to the three Latin translations of the *Phaenomena*, the text found in manuscripts is often accompanied by and intermingled with the works of authors such as Hyginus and also with different types of scholia. When scholars speak of scholia, they are usually referring to excerpts from commentaries found in the margins of medieval writings. From the Classical period and through the Middle Ages, large collections of scholia had become associated with religious, literary and especially legal texts. Sometimes these commentaries were copied along with the original writings and at times even circulated as independent works, which could be consulted in addition to the texts they explained. Since both the original poem by Aratus and the Latin translations had a minimal amount of mythological material, the scholia were added in order to include more details about the myths connected with the constellations.[391] By the third century at the latest, some scholia on Germanicus' translation had already been produced, the *Scholia*

[389] See Kidd and Martin for Aratus' *Phaenomena* in Greek, and Gain, LeBoeuffle and Soubiran for the *Aratea* in Latin.

[390] Le Boeuffle xxxiv "La texte des Aratea de Germanicus est copieusement représenté".

[391] For more information see Alan Cameron, *Greek Mythography in the Roman World*, Oxford University Press, 2004. He states on page 19 that the Germanicus scholia 'can be dated with certainty before ca 300'.

Basiliensia, which added both myths and the star catalog for each constellation.[392]

At some point in the early Middle Ages, a Latin prose version, derived from the Greek poem of Aratus, was produced by an anonymous author, who merely substituted Latin words for the Greek. This rendition of the poem begins with a series of texts on the life of Aratus and some astronomical material; then sections of the poem are interspersed with scholia on the myths and descriptions of the stars. The earliest prose version, which is known as the *Aratus Latinus*, dates from the early ninth century.[393] The *Aratus Latinus* itself was revised probably in the early ninth century by a writer who had access to the third-century Germanicus scholia. The cycle of illustrations was added to this version, which is called the *revised Aratus Latinus* or *Recensio Interpolata*. The *Aratus Latinus* and the *revised Aratus Latinus* were divested of the sophistication and the captivating verses of classical poetry, and thus the descriptions of the constellation figures became as dry as dust. The Carolingians were aware of all of these Aratean texts: the three Latin verse translations of Cicero, Germanicus and Avienus, the Germanicus scholia, and the two prose editions (the *Aratus Latinus* and the *revised Aratus Latinus*) and also the mythical writings of Hyginus that became attached to the *Aratea*. Three of these variations were not illustrated in the Carolingian period: the Avienus, the *Aratus Latinus* and the Hyginus; all others were. Of course the writings of Hyginus were fully illustrated in later centuries.[394] Although McGurk states that there are no early Hyginus manuscripts that include miniatures, I have assembled a listing which

[392] McGurk (1981) 318 The *scholia Sangermanensia* was added later.

[393] McGurk (1981) 318 he cites Maass, 1898, pp. 172-306; and Breysig, 1867, pp. 105-232. The descriptions of the stars are mainly a Latin adaptation of the so-called *Catasterisms* of Ps-Eratosthenes, a mythological companion to Aratus.

[394] Mc Gurk (1966) xxii "The earliest Hyginus manuscripts with pictures date from the eleventh century, possibly the earliest being the Ademar of Chabannes book, Leiden Voss. Lat. Oct. 15 fasc. XIII, made at St Martial near Limoges about 1025."

includes eleven Hyginus manuscripts from the ninth century alone. I have not examined any, but several of these are cited in text editions as illustrated.

Incipits are important for identifying the textual portions of the various astronomical manuscripts. Therefore the incipits for Germanicus, Cicero, and Hyginus are included, but there are variations because of the complicated text situation. Most Germanicus texts have the incipit, *Ab Iove principium magno deduxit Aratus carminis*. Some Cicero manuscripts have the incipit, *Incipiunt vers ciceronis de signis*, but his texts vary greatly. The incipit for Hyginus' *De astronomia*, Book II, in which the constellations are described is: *Sed quoniam quae nobis de terra positione*.

Though both Cicero and Germanicus are concerned with the same subject matter, their translations and treatments of the star material are quite different. The didactic poem of Germanicus is concise and accurate in his rendition of the relative positions and stories of the constellation figures. In comparison, what survives of Cicero's text is more formulaic, repetitious, vivid, and verbose than Germanicus. C. R. Dodwell states, "From both the literary and artistic point of view the most important source was the *Aratus* of Cicero".[395] I would disagree on both counts. Since Cicero's *Aratea* only survives in fragments, it cannot be the most important as the literary source; and its artistic influence was mostly confined to England, as it left the continent in the tenth century. But the addition of large amounts of scholia to both of the Latin authors has changed the pure poetic quality of their original versions. The poetry does not flow from start to finish, but is broken into small sections of six or seven lines, and inserted amidst the various other

[395] Dodwell (1954) 61

prose material. The illuminations are placed mainly before, but sometimes after, the text descriptions. Because of this complex textual situation, the specific content of the *Aratea* text will not be discussed when examining manuscripts, but only the format and placement of the text in respect to the corresponding images of the constellation cycle.

Comparison of Poetic Text and Constellation Images

In general, the pictorial cycle of constellation images is similar and easily recognized for all illustrated versions of Aratean texts. The cycle of images in Germanicus' versions becomes canonical in quantity and in general appearance, as approximately the same number of constellations are discussed and pictured. In most respects, they follow in the same order as originally set down by Aratus. But the illustration cycle in Cicero's *Aratea* is shorter, as his text is fragmentary. Many of the illustrations in the *Aratea* manuscripts are simplified, sketchy images inserted into the body of the text, probably looking back to their papyrus and Late Antique antecedents. Treatises dealing with astronomy and cosmology have been accompanied by illustrations and diagrams from at least the early medieval period, and the influence of the illustrations from the roll can be seen in the ninth-century astronomical and computus texts. When observing the pictures in the few surviving ancient scrolls, the illustrations were fit precisely within the short lines of the columns of script, as shown in chapter 2. But in the codex, since the script area changes and the lines of text lengthen, the space left free for the illustration becomes much too broad for a picture inherited from a scroll. A faithful reproduction of the model would not possibly fill the wide spaces created on the page, and empty gaps would result. In order to fill these gaps, it became necessary to change the model; sometimes two figures are placed side by

side to solve the problem. Just as alterations of the Latin poem occur through the addition of scholia, as well as possible misreading and mistakes by scribes; so in the transmission of pictorial models modifications have also occurred.[396] In spite of this, some classical pictures found in the Carolingian *Aratea* manuscripts were copied with scrupulous care, and are reflections of the illustrations of a vanished past, generally agreed to be the fourth and fifth centuries. The classical flavor of the illuminations survives through the Middle Ages, but in the twelfth century, the more exotic Byzantine and Islamic influences begin to appear, particularly in the Mediterranean area.[397]

Also at this time, changes occur in the placement of the stars in the constellation figures, before the twelfth century their positions are problematic. If the purpose for including stars was a practical concern for recognizing the outlines of star groups, you would expect scientific accuracy. But this is not a consideration in the Latin West, until after the assimilation of the illustrated Arab manuscripts. Before that time, the positions and numbers of the individual stars within the constellation figures is completely random.

In spite of the complications, variations and change, the illustrations clearly fulfill and expand the textual material, included for both aesthetic and informational purposes. These representations influenced not only later book production, but also astronomical art in other media; painting, sculpture and even textiles. In the strongly religious environment of the medieval period, the astronomical illuminations in *Aratea* manuscripts contained and transmitted a wealth of classical symbolism. The images of the constellations and cosmological diagrams are replete with classical allusions, personifications of the sun and moon, river gods, the earth, the

[396] Pächt 23-24
[397] Panofsky and Saxl, passim

winds, the seasons, the Labors of the Months, and the classical gods. The *Aratea* often begin with a map of the entire night sky, another design replete with classical personifications, another tradition that has been little studied.

Illustrations of the Celestial Sphere

A map of the celestial sphere appears in many *Aratea* manuscripts but not all. Possibly the *Phaenomena* of Aratus circulated in antiquity with a map of the heavens,[398] or perhaps a map was added to the fourth or fifth-century prototypes consulted by the Carolingians. There is not just one certain map design, I have determined that at least four different types of celestial maps can be found in Aratean codices. One type of global map looks more scientific, displaying the summer and winter sky in two separate images, and the sky is divided into zones. The ninth-century celestial map in Paris, BNF nouv.acq. lat.1614, f.81v, depicts the figures of the constellations without any indication of stars. In order to include more constellations, this celestial map is divided into two separate hemispheres demarcating the Signs of the Zodiac on the ecliptic, dividing the northern sky and the southern sky. The majority of the constellations drawn on BNF 1614 celestial map are simplified images, depicted from a frontal view rather than the reversed view of most celestial globes. This is another indication that this type of map was taken from a scientific rather than a literary source.

Other maps are more picturesque and include the whole sky in one panoramic view. The celestial representation found in fifteenth-century manuscript BL Add. MS 15819, f.3 is divided into zones, but there is no interest in precise locations of the constellations. A planetary diagram

[398] McGurk (1971) 324

is another option, such as one that appears in Dijon BM MS 448, depicting only the sphere of the planets in their circular orbits. Diagrams of this type sometimes include harmonic proportions between the orbs of the planets, the music of the spheres. In this eleventh-century *Aratea*, the seven planetary gods are pictured with identifying attribute, overseeing their heavenly realms. A fourth and most intriguing variety is a celestial globe, often included in the *revised Aratus Latinus* manuscripts, which presents a completely different format. This type of celestial sphere is clearly derived from antiquity and shows a *sphaera solida* supported on a stand.[399] This large public celestial globe is reminiscent of the Farnese Atlas that was discussed in Chapter 2 as another possible source for imagery. Was this image a remembrance of an actual temple-like structure that held a celestial or terrestial globe in Roman times? Most of the human figures of constellations on celestial maps are classically-derived, fully-naked, and depicted from a reverse view. Surprisingly individual stars are rarely included on celestial maps. This brief description of the variety of celestial diagrams and maps demonstrates the options available to the ninth-century artists; the tradition of including a view of the heavens continues in later *Aratea* manuscripts.

4.2 HISTORICAL BACKGOUND OF THREE SELECTED TIME PERIODS

Although illustrated *Aratea* manuscripts survive from each century between the ninth and the fifteenth, it is not possible in this dissertation to address each individual manuscript and every

[399] McGurk (1971) 324

time period in an extensive manner. Each *Aratea* manuscript is a representative product of its unique time, society, and culture, and it also reflects the available level of technology, expertise and funds. The accompanying illustrations as well, even beyond the competence and talent of the artists, convey the current techniques and popular manners of expression. When examining any manuscript, it is important to consider the historical conditions of the time period in which it was produced. Therefore in keeping with current trends in scholarship, this study of *Aratea* manuscripts takes particular notice of the societal, cultural and religious contexts in which these manuscripts were commissioned, designed or copied. How did *Aratea* manuscript production reflect the needs or interests of the communities that created them? Each of the three centuries singled out for special consideration were times of significant astronomical advancements, each era in its own way inspired a renaissance.

During the first 'renaissance'of western Europe, the era of the Carolingian dynasty, scholars worked to restore classical knowledge, reclaiming many ancient texts. The Carolingian monastic and court scriptoria produced huge numbers of literary, scientific and astronomical manuscripts, including those especially important for this study, the *Aratea* of Cicero, Germanicus and Avienus. Two of the most illustrious *Aratea* manuscripts were written in the ninth century and decorated with outstanding illuminations; they will be examined in connection with their cultural conditions. A total of thirteen *Aratea* manuscripts have been identified and dated to the ninth century. This relatively large number, in addition to the variety of their texts and painted images, are witness to the enormous interest from all areas of the Carolingian Empire in finding and preserving the available Late Antique versions of Aratean manuscripts.

The second ‘renaissance’ of the medieval period occurred in the twelfth century, a time that was crucial for the advancement of astronomical knowledge in the West. During this century, Latin scholars flocked to former Arabic centers of learning to translate the writings and interpret the ancient knowledge of the Greek and Roman scholars, held in the libraries of the Muslims. As seeen in Chapter 3, the most important repositories of these scientific and astronomical treatises were in the reclaimed areas of Spain and Sicily, formerly occupied by Arab societies. The quantity of astronomical manuscripts produced in this century, reflects the renewed interest in classical treatises and in scientific and astronomical knowledge. This interest was spurred not only by the discovery of the enormous quantity and variety of ancient texts, but also by the huge advances and applications achieved by Arabic scholars and astronomers in their scientific studies. The illustrated *Aratea* manuscript tradition continued through this time of growing astronomical interest and expansion of available scientific writings. Although only four *Aratea* manuscripts survive from the twelfth century, that may be an accident of survival. Or more probably, the influx of ‘new’ astronomical writings deflected interest from the well-known and elementary works to the more exotic, exciting and challenging astronomical material recovered from Arab libraries. *Aratea* manuscripts were already available in abundance; consequently new production took a back seat to the ‘lost’ heritage that readers were anxious to discover.

The third and last period of ‘renaissance’ under study is the Italian Renaissance of the fifteenth century, another time of resurgence and rediscovery of classical texts. The largest number of extant *Aratea* manuscripts were created during this formative time. A total of twenty-six quattrocento *Aratea* survive, which is double the total from any other century. The third pair

of manuscripts included in this study come from this century, another pivotal time in the history of astronomy, science and art. During this century, the ongoing revival of ancient knowledge and manuscripts was strongly stimulated by the development of humanism and interest in the classics which spread throughout Italy from its beginnings in Florence. The huge leap in the quantity of manuscripts that survive from the Quattrocento indicates another cultural period with a strong interest in astronomical and astrological writings. This time period is especially rich in new and renewed imagery of the constellations and the reappearance of classical gods and goddesses. These three time periods are most fruitful and profitable when tracing the transmission of Aratean manuscripts and astronomical knowledge in the Middle Ages.

4.2.1 Ninth Century - Carolingian Revival

Beginning in the late eighth century, the Latin West experienced a striking acceleration of scholarly activity, thanks to the sponsorship and patronage of Charlemagne who came to the throne in 768. There were still a few areas with remnants of the ancient Roman culture, but the intellectual resources in western Europe had become almost nonexistent. Under the guidance of Charlemagne and his descendents, scholars, theologians, artists and architects gathered in the Carolingian courts, the 'schools' and monastic centers fulfilling their grand designs. "In the age of Charlemagne until the time of Charles the Bald, the artistic composition of manuscripts reached its first peak in the medieval period."[400]

[400] von Euw (1993) 251

Fortunately the court of Charlemagne and his descendents had wide intellectual concerns, and desired to enrich their libraries with secular as well as religious and liturgical manuscripts. Around 780, Charlemagne himself may have stimulated the creation of writing centers when he asked to receive copies of any rare or unusual books that might be stored at any local libraries.[401] Classical texts found housed in civic or monastic libraries were an important link in the rediscovery of Early Christian antiquity. In any period, the process to choose which texts to copy was highly selective. Those who copied ancient texts chose particular works to transfer from papyrus onto the more durable parchment codices. The Carolingians also were selective concerning which Classical or Late Antique texts they desired to copy and illustrate. Of course their principle interest was aimed toward copying religious manuscripts. Beyond the various religious works, they chose from among the secular texts that were of interest at that time, but their resources were limited to what was actually available in the understocked libraries of ancient Gaul. There was some borrowing from neighboring countries, but the real choice of which manuscripts to copy was restricted by the taste and interests of the monastic leaders. "Their selections have affected our present intellectual horizons."[402] To our advantage, the *Aratea* of Cicero, Germanicus and Avienus all made the cuts and survived that selection process. In fact, Carolingian artists and scribes preserved not only the Latin versions of Aratus, they are responsible for preserving almost all of the classical works from antiquity. "The Carolingian revival saved for us so much of the heritage of Rome and proceeded with such impetus and vigour

[401] McKitterick (1989) 10
[402] Pächt 16

that by the end of the ninth century the classical tradition had been securely re-established."[403]

Manuscript Production

The previously-held view that, before the revitalization that occurred during Charlemagne's reign, the book culture and manuscript production in the West had virtually perished is currently being revised by historians. In reality some Roman institutions continued to be functional after the fifth century, and the heritage of the written word continued as a valued medium.[404] In his current re-analysis of Carolingian cultural history, Herbert Schutz depicts the traditional interpretation of the Carolingian Renaissance as a reductionist response, based entirely on its renewal of Classical Antiquity without crediting the importance influences of the Merovingian, Frankish, Germanic, Celtic, and Insular heritage.[405] The Carolingians were not just 'slavish followers and restorers of Roman ideals, agendas and practices'. Schutz demonstrates that, in denying the complicated development of the cultural milieu of the Carolingians, historians have simplified the real situation, presenting a too narrow interpretation of the "Roman Revival" of the ninth-century.

The manuscripts produced during the Carolingian revival display these myriad cultural traditions and influences in their broad creativity and decorative variety. Just as artworks, architecture and carved ivories were manifestations of wealth and status, so were the lavishly illustrated and decorated manuscripts. It is impossible to know exactly how many books were produced from the late eighth through the ninth century, but well over 7000 Carolingian

[403] Reynolds xvii
[404] Schutz 138
[405] Schutz 3

manuscripts, including most of the classical authors, survive from this time, a total of about 50,000 may have existed.[406] The power and material wealth of the Carolingians is demonstrated by their enormous book production which in turn reveals their expertise, scholarship and organization.

Charlemagne's administrators encouraged the highest standards for the production of books in both the text and the illustrations. The textual contents were expected to be accurate and the script was required to be clear, precise and legible. The competent scribes developed the small, neat and standardized forms of the Carolingian miniscule alphabet, enabling manuscripts to be written more rapidly and read without difficulty. Standard versions of the various treatises were made from the oldest and best texts to insure that the copies of both secular and sacred works were authentic and reliable. The illuminators achieved a high level of artistry and instituted new methods of decoration in the magnificent illuminated codices created in the scriptoria of the Carolingian empire. Although some of the new Carolingian techniques were derivative, much of their artwork was highly creative and entirely innovative. The *Aratea* manuscripts display this variety of artistry, and the interest of ninth-century leaders and scholars in the course of the stars. Several pictorial variations in the constellation cycle are known from the Carolingian period, and they constituted by far the largest body of secular imagery.[407] Many of the initial scholarly accomplishments of the Carolingian renewal were orchestrated by the monk and scholar, Alcuin, who was well-versed in astronomy.

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[406] Schutz 155
[407] McGurk (1981) 317

Alcuin (ca. 730-804)

Alcuin was already fifty years old when Charlemagne called him from his post at York, where he had been master of the cathedral school, to hold a chief position in the royal court. In England, Alcuin taught a scholarly program based on the liberal arts, including astronomy, with an emphasis on knowledge needed for the practice of computus. Alcuin wrote a small treatise on the motions of the Moon emphasizing its daily passage through the Signs of the Zodiac, called *Ratio de luna*.[408] Since Carolingian manuscripts exhibit the earliest known representations of the zodiac in Christian art, Alcuin may have been a factor in their reappearance. Kühnel suggests that the revival of pagan zodiacal representations in Christian art during this time was quite likely made possible by Alcuin's positive attitude to the ancient concept.[409]

Charlemagne's personal interest in astronomy can be verified by his correspondence with Alcuin in the years 797-800.[410] Eight letters survive that were written by Alcuin and one by Charlemagne, although several more can be surmissed from allusions made in the contents. In one of the letters, Alcuin asks Charlemagne to send him Pliny's *Natural History*.[411] This series of letters between Alcuin and Charlemagne concerning various aspects of astronomy reflects an atmosphere of great interest in celestial phenomena and lively discussion at the court.[412] After the death of Alcuin, another scholar named Dungal became the resident authority in matters

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[408] Kühnel (2003) 104

[409] Kühnel (2003) 104 except for the sixth-century mosaic in the monastery of the Lady Mary in Bet She'an. (See Chapter 2)

[410] See D. Lohrmann, "Alcuins Korrespendenz mit Karl dem Grossen über Kalender und Astronomie" in *Science in Wester and Eastern Civilization in Carolingian Times*, eds. P.L. Butzer and D. Lohrmann, (1993) 79-114; also A. Borst, "Alkuin und die Enzyklopädie von 809", in the same volume.

[411] McCluskey (1993) 163 Here he cites Bischoff, *Hofbibliothek*, p.42.

[412] Kühnel (2003) 107

concerning astronomy and computus. He too corresponded with Charlemagne, especially about two solar eclipses that occurred in the year 810.

Computistical Anthology of 809

In 809 under the auspices of Charlemagne, a colloquium gathered together prominent astronomers and computists, probably coordinated by Adalhard of Corbie, an expert on computus.[413] The colloquium was an extensive intellectual and scientific project focused on refining the calculation of time and compiling the 'official computus'. The reform conference resulted in the production of an illustrated manual, probably completed in 810, which added antique texts on science and mythology to the traditional computistical data.[414] Although the compendium was written five years after the death of Alcuin, his scholarly influence was surely felt. The anthology included a calendar noting important celestial and liturgical events, and computistical tables with explanatory texts that provided instructions for calculating religious dating, mainly Easter. Although the original manuscript is now lost, it is reflected in four incomplete ninth-century copies. Two related but different versions of the anthology survive: known as the three-book-computus and the seven-book-computus.

The three-book computus, also called the *Computus of 809*, is a compilation of astronomical material found in two manuscripts, Vienna ÖNB Cod. 387 and Munich BSB Clm 210, both early ninth century.[415] Another anthology, an expanded seven-book computus, was

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[413] McKitterick (1994) 23
[414] McCluskey (1998) 135-38
[415] McCluskey (1993) 139-160 Book I of this anthology is devoted to practical computistical matters in 99 chapters, much of its material was taken from Bede which was ultimately derived from Pliny. Book II deals with planetary excerpts from Pliny; and Book III consists of Bede's *De natura rerum* in 51 chapters.

created in Salzburg around 818 containing similar astronomical material, perhaps intended as an improvement to the earlier version.[416] The seven-book computus contains additional sections and paraphrases from Macrobius and two very brief exerpts of Martianus Capella on the size of the earth and the moon.[417] The earliest of the surviving manuscripts of the seven-book computus is Madrid MS 3307, made at Metz between 820 and 840. Another Carolingian copy is Città del Vaticano, BAV Vat. Regin. 309, the only complete copy that is extant. The others are Città del Vaticano, BAV Vat. Lat. 645 (s. IX); Monza Bibl. capit. MS F.9.176 (ca. 869) and Paris BNF n.a.l. 456 (s. IX/X).[418] An important development in the manuscripts from the 809 colloquium, showing their interest in ancient astronomy, was the inclusion of Pliny's planetary astronomy plus their addition of diagrams and illustrations. Only one apsidal diagram is included in the three-book, whereas four diagrams accompany the text in the seven-book computus. The diagrams are teaching tools as they are not images of the real positions of planets, but are abstract representations of theoretical elements. The descriptions of the Zodiac and the constellations are illustrated, not by the depiction of their actual locations or brightness, but with their associated mythological characters.[419] Nevertheless, the computus was an important resource for astronomical information as were the writings of Plato.

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[416] McCluskey (1993) 139-160

[417] McCluskey (1993) 139 Macrobius explains how to measure the diameter of the Sun which he shows is twice the diameter of the earth. It also contains Martianus' explanation of Eratosthenes' determination of the size of the earth.

[418] See Appendix B

[419] Kühnel (2003) 108 Here the author states in an analysis of the anthology of 809 or the 'Aix in Chapelle encyclopedia' that "..the zodiac in the heaven of fixed stars is depicted in detail, then the motions of the planets through the signs of the zodiac, following Aratus and Pliny." Pliny may be a correct reference, but Aratus does not refer to the signs of the zodiac separately, only as they appear among the other constellation, and he emphatically refuses to discuss the planets at all. He never mentions the planets' appearance in the zodiac or astrology, which is the only reason for recording in which zodiacal sign a planet is located.

The *Timaeus* of Plato contained cosmological theories that were preserved in Carolingian manuscripts. The *Timaeus* was the only original Greek philosophical work available in the early medieval period, but it had received little attention until the revival of Greek learning in the ninth-century. Interest in Plato was spurred by the work of philosopher and translator John Scottus Eriugena. Latin translations of the *Timaeus* by Cicero (incomplete) and Calcidius (with accompanying commentary) are extant in ninth- and tenth-century Frankish manuscripts.[420] Thus Carolingian scribes assured the continuation of the cosmology of Aratus, Plato and Pliny into the eleventh and twelfth centuries at which time translations of Arabic texts began in earnest.

Louis the Pious (778-840)

The great revitalization program begun by Charlemagne was continued by Louis the Pious. Although he is not credited with the administrative and ruling abilities of his father, according to recent scholarship the early years of Louis' reign have been described as the "absolute summit of the Carolingian Empire".[421] The main source of information concerning his reign is found in *Vita Hludovici Imperatoris* by his anonymous contemporary biographer and court chronicler, simply called 'the Astronomer'. In the biography, 'the Astronomer' tells of Louis' interest in the heavens and relates the account of Louis' observation of a comet.[422] Charlemagne's policy of sponsoring education continued through the reigns of Louis the Pious

[420] McKitterick (1994) 24
[421] Butzer 455
[422] The Astronomer, *Vita Ludovici PL* 104, col. 971-72. Louis asks the meaning of the comet, aware of the dire predictions attached concerning the death of the ruler. In reply, 'the Astronomer' quotes the Old Testament, one should not fear signs in the heavens. The comet turns out to be Halley's comet, which was depicted on the Bayeux Tapestry two visits later.

and his contentious sons who also sponsored 'schools' and maintained scholars, libraries, and scriptoria at their respective royal courts.[423] The important monastic learning centers, such as Corbie, Tours, Ferrières, Fulda and Reichenau, started their expansion and manuscript production at this time. Two of the most important *Aratea* manuscripts were most probably created during the reign of Louis the Pious. Mütherich states that one may be tempted to think of the impression that the comet in the year 837 made on the Carolingians and which may well have justified the dedication of an astronomical picture book to a member of the court.[424]

Book Illumination at the Court of Louis the Pious

Charlemagne is known to have had an extensive library, and he and his successors were thought to collect as many Late Antique manuscripts as they could.[425] The fate of Charlemagne's famous library is unknown, but it is most impressive to see how many outstanding Late Antique manuscripts were still available at the Carolingian court.[426] In regard to the Roman Vergil, David Wright states, "it is reasonable speculation that it may have been one of the manuscripts collected by Charlemagne when he was in Italy, perhaps at the time of his coronation in 800, and taken to his court in Aachen".[427] Louis the Pious had a library and a librarian at his residence in Aquitaine and also at Aachen. Manuscripts that can be definitely linked with Louis are rare, but at least four illuminated manuscripts which can be attributed to the central region of the Carolingian empire

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[423] Stevens (1995) 175

[424] Mütherich (2004) 107

425 Katzenstein 9 "There is reason to believe that the Virgil manuscripts now in the Vatican Library once belonged to Charlemagne".

426 Bischoff (1994) 73 "It is rather unlikely that it completely ceased to exist after 814 in accordance with the instruction in Charlemagne's will to sell his books", and give the money to the poor.

427 Wright, The Roman Vergil, and the Origins of Medieval Book Design, University of Toronto Press, 2001. He continues, "Then when his library was dispersed after his death in 814 it seems to have gone to the royal abbey of Saint-Denis, where it certainly was during the Middle Ages". 68

were actually produced at the court itself. All four date from the second quarter of the ninth century, all are unique works and all are copies of antique manuscripts with impressive picture cycles.[428] Two of manuscripts are Cicero's *Aratea*, Harley 647 and Germanicus'*Aratea*, Leiden Voss Q.79. These astronomical texts with their classical imagery provide a glimpse at the capability of book illuminators at the court of Louis the Pious. Astronomical pursuits and illustrated book production continued after the death of Louis, as many famous manuscripts were produced during the reign of Charles the Bald as well.

Charles the Bald (823-877)

Charles the Bald was the best educated Carolingian ruler, thanks to his mother, Empress Judith. She requested that Walafrid Strabo, a poet and scholar who had studied at Fulda from 827 to 829 under Hrabanus Maurus, became tutor to the young prince at the royal palace at Aachen. Walafrid tutored young Charles for nine years. Along with Walafrid, many of the best Carolingian scholars belong to the period of Charles the Bald: Odo of Metz, Einhard, Adalhard of Corbie, Dicuil of Iona, John Scottus Eriugena,[429] Lupus and his student Helperic of Auxerre, and Remigius of Auxerre, who may be considered the last of the Carolingian scholars. Charles the Bald was considered a great bibliophile, and was the patron of the 'school' of Reims where he commissioned many deluxe religious manuscripts.[430]

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428 Mütherich 104 "The oldest is the Vatican Terence (Vatican lat. 3868), written about 825, and also the Agrimensores codex of the Vatican Library, a collection of illustrated treatises by Roman surveyors."

429 McCluskey 157 Eriugena, poet, philosopher and teacher, wrote a poem "Aulae siderae" for the dedication of the palace church, drawing upon "the traditional bond associating rulers with astronomy". His poem was filled with "astronomical metaphors and numerical harmonies with the spiritual significance". He tells of solstices and equinoxes and their relationship to the conception and birth of Christ and John the Baptist.

430 Mütherich 318

Charles the Bald appears to be the first ruler depicted in many religious manuscripts, especially those from Tours and St Denis.[431] His portraits appear as dedications which is appropriate since the king was usually the patron or recipient of the manuscript. But the royal representations from the Carolingian period appear to be idealized portrayals intended more to display the majesty and power of monarchy rather than actual portraiture. The glorified image of the royal presence refers to his function as supreme head of the empire fulfilling the biblical precedent and its cosmic relationships. To enhance his legitimacy, Charles the Bald associates with and models himself on biblical King David; in the *Vivian Bible*, he is compared to David three times.[432] King David himself appears in the *Vivian Bible*, playing the lyre in a celestial setting, in a similar manner to Charles, accompanied with musicians and soldiers. (Figure 5) These depictions and comparisons contributed in a significant manner to the evolution of medieval kingship.[433] Toward the end of his reign 'furthering his divine aspirations', Charles was crowned emperor by the pope on Christmas Day, mimicking his grandfather, but exactly seventy-five years later.

Astronomical Imagery as a Source of Power and Prestige in the Carolingian Court

The Carolingian intention to idealize the Christian kingdom, the *Imperium Christianum*, by reproducing the Heavenly Kingdom on earth, assigned a primary role to education and religious imagery.[434] But the architectural and artistic ideals of the Carolingians were always reaching back to Christian Rome, even promoting the cult of relics to reinforce their religious

[431] Kessler 125
[432] Kessler 109
[433] Stahl 248
[434] Schutz 375

status and redirecting the authority of the Eastern empire. Their concept of representing majesty or elevated status was borrowed from Roman prototypes, and so the return of the imperial pictorial image reappeared under the heirs of Charlemagne. The Carolingian emperors elevated their image by including imperial portraits in illuminated religious manuscripts and minting coins with royal iconography. The idea of exemplifying elevated status was derived from Roman relief sculpture and mosaics which we saw in Chapter 1 included astronomical imagery.[435] They elevated their claim to legitimacy by associating themselves with the earlier Christianized Gallo-Roman areas of the Empire, and also with the royal figures of the Old Testament.[436]

Artistic representations demonstrate the desire to establish imperial continuity with the biblical and Classical past in order to legitimize the Carolingian dynasty and assure its continuation into the future by claiming earthly and divine authority. Associations with King David of the Old Testament were novel and the attempt to create a new Davidic kingdom on earth populated with a new chosen people, a renewed imperial Roman Empire, but Christianized and centered around a new Jerusalem. The presentation illumination in the *Vivian Bible* portrays Charles the Bald enthroned in the heavens, as cosmic king and semi-god, appointed by God himself as his representative. With a definite political agenda and divine authorization of his reign, Charles the Bald joins his reign with the heavens, projecting himself set among the clouds rather than seated on the ground or in an architectural setting. He sits enthroned in a celestial setting surrounded by his attendants and monks simulating an honored constellation figure. The

[435] Astronomical images carved on Carolingian ivories are discussed in the following section, also see "The Ivory Throne of Charles the Bald" in Nees, *A Tainted Mantle.* Constellation images appear on a casket that survives at Bayerisches Nationalmuseum, Munich, and also on a comb in the Victoria and Albert Museum.

[436] Schutz 15

Right Hand of God reaches down from above, extending rays of light over Charles' head, reaffirming that he was divinely chosen and protected. Another illustration in the *Vivian Bible* also includes astronomical symbolism, to which I now turn.

Initial D, Incipit page, St. Jerome's Prologue, *Vivian Bible,* Paris BNF, Lat. MS 1

The royal portrait of Charles the Bald at the end of the *Vivian Bible* has received most of the attention by art historians; but there is another illumination in that Bible which has attracted little attention.[437] The decorated initial at the opening of St. Jerome's, *Preface to the Pentateuch*, on folio 8 of the *Vivian Bible* holds hitherto unrecognized scientific information.[438] This decorated initial is especially significant since, of all the Touronian Bibles illustrated in Koehler's study, this is the only one to include the Signs of the Zodiac in the Desiderius initial. Around the large decorated initial 'D', ten Signs of the Zodiac are drawn in their traditional symbolic representations. But actually eleven Signs are embedded into the 'D' as Virgo and Libra have been conflated into one single figure of a woman holding the Scales. The symbols of the Sun and Moon, Sol and Luna shown driving their fiery chariots, are situated in the center of the historiated 'D'. The honored Sun and Moon have each been encircled to indicate their heavenly orbits. Note that the two fish representing the constellation of Pisces have been displaced from their normal sequence among the Signs of the Zodiac to a position of honor in the center of the initial. This decorated initial has been cited by J. J.G. Alexander who comments on the classical appearance of

[437]The *Vivian Bible* was produced at the Abbey of Saint Martin at Tours and presented to Emperor Charles the Bald in 846. It is perhaps the 'most beautiful of all the books produced at Tours'. Rosamond McKitterick, "The Palace School of Charles the Bald", in *Charles the Bald: Court and Kingdom* 1981.

[438] P. McGurk, in "Carolingian Astrological Manuscripts", draws attention to the zodiacal initial, but does not comment on the special placement of Pisces. p 317

the folio, with the gold on purple panels of the folio, typical of the Carolingian period.[439] Alexander states, "the imaginary space apparently provided in the center of the 'D' for the Sun and Moon is negated by the flanking Fish".[440]

The relevance of the special placement of the two fish of Pisces has been overlooked by historians; this Sign, I suggest, was not randomly chosen merely to fill an empty space, as Alexander says, "*horror vacui*". Note that the Sun is situated precisely on the cord that attaches the two fish. This association of the Sun with that specific spot in the constellation of Pisces alludes to particular astronomical information. Ancient and medieval astronomers were well aware that a significant change occurs in the heavens approximately every 2100 years. At that time the Sun, on the vernal equinox, rises against the background stars of a new constellation. This gradual celestial movement of the Sun through the Zodiac is called the Precession of the Equinoxes, the ultimate time-keeping event. The arrival of the Sun into a new zodiacal sign signaled the breach of a new age, a time signified in artistic iconography. Around 100 BCE, there was such a transformation in the heavens. The sun first began to rise within the constellation of Pisces, having precessed backward through the Sign of Aries into the new Sign. The very first verification that the Sun had definitely moved into the new astronomical Age was confirmed when the Sun, at the spring equinox, rose in alignment with the first star of Pisces, *Alpha Pisces*, or what the Greek astronomers referred to as *Nodus Caeli*, the Knot of the Heavens.[441] This initial

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[439] Alexander, *(The Decorated Letter*) 52 He suggests that because the historiated initial appears at the beginning of the Bible, it may refer to the Creation of the Sun, Moon and Stars in Genesis 1:16.

[440] Alexander 52

[441] For more information on the significance of the *Nodus Caeli* in the *Phaenomena* of Aratus, see De Callatay, Godefroid, "The Knot of the Heavens", *Journal of the Warburg and Courtauld Institutes*, Vol. 59, 1996, 1-

star in the constellation of Pisces is the closest to the stars of Aries.

In this historiated initial from the *Vivian Bible*, the Sun sits directly on the knot of the cord, symbolizing, I think, this crucial moment in astronomical time. This transition from the Age of Aries into the Age of Pisces was a time of particular note for Roman astronomers who were observing the event,[442] and the Age of Pisces was especially meaningful to later Christian theologians because this shift in the heavens heralded the birth of Christ. This 'coincidence' was not lost to Christian scholars, as the symbolism of the fish was and still is associated with Christianity. This particular classical symbol of the new Age may have been recorded visually and encoded in various scrolls or codices by Hellenistic or Roman illustrators. This classical or Late Antique design could have been copied and/or adapted to create the letter 'D' by the medieval illuminator of the *Vivian Bible*, totally unconcious of its special significance. Or perhaps 'the Astronomer', or another knowledgable astronomer, was still at the royal court of Charles the Bald, and conciously designed this initial for the *Vivian Bible*; just as he may have designed the significant planetary diagram in the Leiden *Aratea*. Astronomical symbolism appears again on the series of carved ivories created for the throne of Charles the Bald. Some scholars suggest these cosmological ivories on the throne indicate a Carolingian revival of royal apotheosis, which was artistically pictured as the heavenly reward for early Roman emperors. (See Chapter 1)

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13. In this article, the author points out the fact that Aratus mentions the constellation of Pisces twice in the poem, the second time he mentions 'the knot of the heavens' is on line 365. Alpha Pisces, even though a minor star in brightness, is praised in the poem for its significance, bringing more attention to its stature and emphasizing its special significance as the astronomical marker of the new Age of Pisces, just as we are now moving into the new Age of Aquarius.

[442]According to Ulsaney, this precessional event was secret knowledge, precious to members of the cult of Mithras, and hidden in the astronomical iconography of the tauroctony scene. See Chapter 2.

The Ivory Throne of Charles the Bald

The Baroque bronze monument, *Cathedra Petri*, created by Bernini for Saint Peter's contains within it a much earlier ivory-decorated wooden throne. The inner throne only became available for study after it was removed in 1968, and scholars have no doubt that the iconography and decorative style of the ivories dates it to the Carolingian period, most probably the reign of Charles the Bald.[443] It may have been taken to Rome by Charles on the occasion of his imperial coronation. At the top of the pediment of the throne, is carved an image of the emperor, identified as close in appearance to the surviving 'portraits' of Charles the Bald. Near the royal figure are cosmological images, personifications of the Sun, Moon, and Earth and depictions of some constellations were also carved on the pediment and sides of the throne. These stellar representations appear to be accurate copies of their models, which Weitzmann suggested are found in the Leiden *Aratea*. In his study of the ivories Nees states, "Weitzmann showed that the constellation figures of the pediment gable are based upon illustrated Aratus manuscripts". He adds that for other models the artists used, "perhaps a different astronomical manuscript for the images of the constellation Engonasin, first identified with the hero Hercules in the early ninth-century manuscript in Cologne".[444] Celestial associations were common during the Carolingian

[443] Nees 149-50 The most likely time period for the carving of the vine-scroll patterns with figures is the late Carolingian schools of Metz or the court school of Charles the Bald or both.

[444] Nees 153-4 The other possible model is Cologne, Dombibliothek, Cod. 83 II (ca. 805), which is a close likeness to Hercules with the Golden Apples. The study by Nees is mainly concerned with the illustrations of the Labors of Hercules which are attached to the front of the throne. In addition to Hercules scenes, there is a carving of Scorpio and also some mythological animals, definitely not zodiacal. He compares the carving of Hercules and Achelous with the illustration of Eridanus from MS Harley 647. There is some likeness, but that example is seen in many astronomical manuscripts. See also Kurt Weitzmann, "The Iconography of the Carolingian Ivories of the Throne" in Maccarrone et al, Nuove ricerche sulla cattedra lignea di S.Pietro in Vaticano, Atti della Pontificia Accademia Romana di Archeologia, (1975) 217-245.

dynasty and continued in the Ottonian period.

Other Royal Astronomical Appropriations

A final brief example of the royal attribution of astronomical symbolism is the adoption of the antique custom of stellar ceremonial robes. These decorated mantles had a long historic tradition and would present majestic rulers to their subjects enrobed with celestial symbols, inviting comparisons with the wise leaders of the Old Testament, such as Solomon or Aaron, or with the philosophic expertise of Plato. In Late Antiquity, billowing capes filled with stars were pictured on images of celestial and mythical gods, particularly Mithras. The earliest surviving astronomical robe dates to the reign of Emperor Henry II (1002-1024). The ceremonial mantle that he wore, probably at his coronation, was made of deep violet silk and embroidered with gold thread. The robe bears the label, *descriptio tocius orbis*, providing an image of the entire celestial sphere with each of the constellations pictured. An image of Christ surrounded by the symbols of the four evangelists appears above representations of the heavens.

The star mantle of Henry II utilized religious along with astronomical symbolism as an expression of the sovereign's cosmic power, and these celestial images were closely associated with an *Aratea* manuscript. A dissertation written on this star mantle has determined that the constellation figures on the royal robe were derived from a ninth-century illustrated astronomical compendium that contained texts of both Hyginus' *De astronomia* and Cicero's *Aratea.*[445] On the edge of the mantle reads: *Pax Ismaheli qui hoc ordinavit*, showing that the person who ordered it

[445] The 'Star Mantle of Henry II' is the topic of a doctoral dissertation by E. O'Connor, Columbia U. 1980, and the mantle is discussed in great detail also in McCluskey (1998) 141-144. O'Connor found close relationships with the astronomical illustrations of the mantle with those in two ninth-century 'star catalogs', St. Gall Stiftsbibliothek MS 902 and its copy, St. Gall MS 250, both *revised Aratus Latinus*. pp. 63-66, 108.

was either a Jew or from the East. “The Emperor’s mantle was a result of that new movement which spread to the north from Spain and southern Italy, the two countries where Greeks and Arabs mingled freely with people of the western world”.[446] These surviving examples; the numerous copies of the *Aratea*, the appropriation of astronomical symbolism, the throne from the ninth century, indicate the significance of astronomical affiliation, imagery and knowledge that links the earthly reign of the kings with the celestial realm. The contribution of the Carolingian scholars to the transmission of astronomical knowledge is immeasurable.

4.2.2 Twelfth Century - Revival of Ancient Astronomical Treatises

The second set of manuscripts chosen for particular scrutiny come from the twelfth century, another crucial time in the advancement of astronomical knowledge and also in scientific manuscript production. The changes that transpired in western Europe at this time had profound influences on intellectual history. At the start of the twelfth century, the fundamental science education was based upon the older encyclopedists and the standard manuals of elementary astronomy and *computus*. The only learned sources available to western scholars were those mentioned many times: Pliny, Macrobius, Martianus Capella, Isidore, Bede, and the Latin commentators on Plato’s *Timaeus*. Their texts were not entirely abandoned for their systems of thought were deeply rooted in medieval cosmology. But by the middle of the century, there had been a definite revival of the Platonic cosmology through the recovery of his original works,

[446] Saxl, “Belief in Stars” in *Lectures*, 89

chiefly in conjunction with the 'school of Chartres'. These Platonic influences could already be clearly seen in the first appearances of Arabic astronomy.[447] By the end of the century, the translations of Ptolemy's *Almagest*, the tables of al-Khwarizmi and al-Zarkali, and the treatises of Abˆ Ma'shar and al-Sˆf′, along with the mass of astrological literature from early Latin sources, had conveyed the vast body of ancient Greek and medieval Arab astronomy to the Latin West. This newly-acquired knowledge from pure sources, along with the more exact celestial observations by Arab astronomers, brought great advances as well as controversies that occupied scholars for centuries. The intellectual climate made a great leap as education at the beginning of the twelfth century was confined to monastic and cathedral schools, by the end the earliest universities had been founded.

The sharp contrast in the complexity of astronomical manuscripts produced at the beginning of the twelfth century with those created at the century's end indicate the intellectual progress of this spirited period. Instead of just recopying the 'miserable' writings of Hyginus and the watered-down astronomy of Macrobius, Martianus and Ps-Bede, scholars now had access to the exact mathematical astronomy of Ptolemy and treatises of other Greek and Roman astronomers as well as the writings, advancements and commentaries of generations of Islamic scholars. In addition, the interest in literature and scientific knowledge, which had been confined almost entirely to the courts and monasteries, began to spread outward to broader layers of society. Great changes were occurring in cultural society too, as the Gothic style took precedence over the Romanesque, dominating architecture, sculpture and painting by the end of the twelfth

[447] Haskins (1927) 82 This can be demonstrated by the *Questiones* of Adelard of Bath and the *De essentiis* of Hermann of Carinthia.

century.

Throughout the intellectual history of Europe, advances toward improved education and the cultivation of art and literature had, of necessity, always looked to the antique past for inspiration and guidance. The illustrations of the constellations and planets too had always been modeled on those copied from antique originals. This transitional century saw that change as the simple practical astronomy found in the manuscripts of Virgil, Pliny and the *Aratea* traditions, gave way to the more sophisticated theoretical astronomy known in the Arabic world. But still the classical illustrations that had been preserved by Carolingian illuminators continued to be copied and retained in *Aratea* manuscripts. Although only four survive from the twelfth century, *Aratea* manuscripts were a continuing part of this tradition of looking back.

Compared to the Latin West, the Arab conception of the constellations and the Signs of the Zodiac was basically the same, since both were founded on the traditional designs from antique sources. Naturally the Arab artists orientalized the celestial images by adapting their garments and their iconography to more familiar designs. After exposure to the Islamic illuminated manuscripts, twelfth-century artists in Europe continued to devise the same general format and appearance, but traces of the Islamic influence can be observed in the attire and the iconography of the figural images. In the thirteenth and fourteenth century, contacts continued with the Islamic culture through trade and interchanges, and the consultations of Arabic, Jewish and Christian scholars as they absorbed the advanced theories and tried to solve problems in

astronomical theory.[448]

Influence of Islamic Manuscripts in the West

Islamic scientific books influenced manuscript production in the Latin West in both their intellectual content and their artistic design. Knowledge of the earthly and celestial worlds preserved in texts of the Greeks and Romans had been copied and translated into Arabic from the fourth century onward. Each generation of Arab scholars made new contributions and observations to the classical treatises. In addition to their translations, commentaries, and mastery of Greek and Indian geometrical astronomy, the original scholarly work accomplished by Arab astronomers was apparent in their writings, calculations and inventions. A particularly important contribution was their composition of the *zij*.[449] The Arab writers were primarily responsible for re-asserting astrology into medieval Europe, as it had flourished during the Roman Empire, but had disappeared for the most part by the end of the fifth century. They combined astrology and its influences with other disciplines in which they were adept.[450]

Just as in the West, Arabic manuscripts were often produced or received as gifts, preserved in important libraries, and collected by powerful courts. Already in the eighth and ninth centuries in Bagdad and the Byzantine world, many scientific manuscripts, particularly Ptolemy's *Almagest*, had been copied in beautifully decorated manuscripts. Later astronomical manuscripts

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[448] Goldstein, 'Theory and Observation in Medieval Astronomy' in *The Scientific Enterprise in Antiquity and the Middle Ages*, M. H. Shank, ed. (2000) 205-213

[449] Hill 492 A typical *zij* would contain a listing of the various aspects of mathematical astronomy: chronology; trigonometry; spherical astronomy; planetary mean motions; planetary equations, stations, and latitudes; parallax, solar and lunar eclipses, and astrology.

[450] The Arabs developed an astrological medicine that prescribed drugs and remedies under the influence of the auspicious planet, and establised the connection and sympathies between the stars and planets with metals, jewels, stones, plants, minerals, and even spices. Every aspect of life on earth, especially humanity, had a correlation with the movements of the heavens, "As above, so below".

such as those of al-Sˆf′ were also abundantly illustrated with the familiar series of constellation illustrations. In addition to scientific manuscripts, the East had a tradition of brilliant literature with beautifully illustrated books, created to inform and entertain the readers.[451] The Islamic illuminations show no trace of classical illusionism; they exhibit a flatness, lack of modeling, a simplification of forms, displaying a palette of rich but mellow colors, as seen in al-Sˆf′ manuscripts. The head covering which is wrapped around the neck in ready for a desert sandstorm is a typical Arab costume. The attire and iconography from Arabic astronomical imagery works its way into Western manuscripts.

Influence of Astronomical Imagery in Christian Art

By the twelfth century, fascination and interest in celestial symbolism continued its popularity, and the iconography of constellations and planets had been appropriated by Christianity as well as royalty. Astronomical imagery appears in church sculpture, for example St Denis, Chartres and Amiens, and in religious books, church calendars and later, in Books of Hours.[452] The Signs of the Zodiac had become ultimate symbols, not only of the passage of time, but of the power and majesty of the Creator. The physical attributes of Apollo, with alterations, have been transferred to Christ, and the Virgin Mary is associated with the Moon. Through the next centuries noted for wars, famines and plagues, the celestial symbology, mythological

[451] Oleg Grabar has published a recent study, *Mostly Miniatures: An Introduction to Persian Painting,* Princeton University Press, 1999, in which he presents a survey of the present state of the literature on Persian, Arabic, and Turkish painting. He notes the paucity of scholarly work on Persian painting, partly due to difficulties of access. He calls it the 'poor relation in the history of art'.. 'generally neglected in the important manuals of medieval art". Since they are generally on paper, Islamic manuscripts are difficult to access and rarely displayed or seen in order to protect their delicate palette and precious artwork. p. 2

[452] See Hourihane, Colum ed., Time in the Medieval World: Occupations of the Months and Signs of the Zodiac in the Index of Christian Art, Princeton, 2007

heritage and accumulated astronomical knowledge continue to develop, and *Aratea* manuscripts continue to be produced in modest numbers. While scholars still debated the extent and meaning of the ‘renaissance of the twelfth century’, the advancement in the body of astronomical knowledge cannot be negated. The cultural and intellectual outburst witnessed in the twelfth century was reactivated by the discovery of ancient art and yet more ‘lost’ knowledge, especially astronomical, in the fifteenth century.

4.2.3 Fifteenth Century - Revival of Ancient Astronomical Knowledge

The fifteenth century was the third historical period relentlessly dedicated to the recovery of the texts of ancient Greek and Roman authors, especially mathematics, medicine, astronomy, astrology and magic. In their search for ‘hidden’ knowledge, scholars studied ancient Greek authors and re-examined certain antique writings that were already well-known, resulting in new interpretations. They dedicated themselves to reviving antiquity, searching for, collecting and studying works of the ancient scholars and philosophers. Inspired by enthusiasm for the Roman past, their goal was the pursuit of classical learning and classical inspiration. Interest in ancient cosmology was revived in both theory and practice, but astronomical knowledge at this time was still based for the most part on ancient traditions credited to the work of astronomers of the past. Included in the revival, brought about by humanistic research, were the ‘occult’ sciences: mysticism, hermeticism and astrology. Disguised in its new scientific applications, astrology

spread throughout Italy and beyond to the north, by the efforts of physicians and humanists.[453] The experimentation, debates and assimilation of this revived 'occult' knowledge led to new discoveries and astronomical interpretations essential for the future developments of Copernicus, Kepler and Galileo. Thanks to the ground-breaking work of Thorndike, Saxl and scholars at the Warburg Institute, the study of these 'wretched subjects' was opened for serious research.[454] The vigorous interest in humanistic inquiries and writings created a great demand for books in the period just before the scribal culture gave way to the printed culture.

Astronomical Manuscripts in the Fifteenth Century

Even in the aftermath of the invention of printing, manuscript illumination continued and enjoyed a final period of artistic output. Beginning in Florence, the art of book illustration associated with humanism achieved a new standard of excellence. An active book production and trade network developed and spread from there, serving the diffusion of the revived classics as well as important works of medieval thought and learning. Scribes and illuminators created extravagant and lavish manuscripts in which their abilities were highlighted. The upper classes commissioned devotional Books of Hours in order to display their piety and status, and they purchased illuminated manuscripts of literary works, such as the romances of Alexander the Great

[453] Bini 30 "There were three centers where the study of astrology enjoyed the greatest development: Bologna, Padua and Milan. Already in 1125, there was a Chair of astrology at the university of Bologna, and its popularity increased continually during the 14 and 15th c. the university course, in the true sense, dates back to the 14th c with Guglielmo di Montorso and Pietro d'Abano, famous astrologer and physician (1257-1315)' P 31 in the 15th c most of the astrologers were doctors, philosophers and scientists, thanks to their research, contributed to the progress of knowledge and civilization."

[454] Saxl, "The Revival of Late Antique Astrology" in *Lectures*, p. 73-82 Saxl warned not to consider the study of astrological history futile, and believed it to be fundamental to a deeper understanding of the motives that inspired the passage of philosophy and art from the Middle Ages to modern times, especially in Italy.' See also Neugebauer, 'The Study of Wretched Subjects".

and Lancelot, for entertainment. Natural philosophy and astronomical texts, particularly the *Aratea*, were collected to exhibit their intelligence and erudition. By the fifteenth century, all available astronomical knowledge had been digested and assimilated into the European intellectual tradition. A variety of original texts had been produced by scholars in the universities in which they applied their 'new' astronomical capabilities to traditional problems such as the calendar. The writings also debated the cosmological and religious implications raised by many surprising and provoking discoveries.[455]

Astronomical illustrations were no longer limited to the simplistic series of isolated figures that had been depicted in medieval manuscripts. Numerous variations on the classical constellation cycles appeared in conjunction with the different astronomical and astrological writings. A distinctive set of illuminations were derived from the writings of Michael Scot, replacing the genuine antique images with newly-designed or orientally-influenced figures. Scientific perspective, realism, and other aspects of fifteenth century artwork, could influence some *Aratea* miniatures as well. Astrological theory and its derivations introduced another dimension to cosmological art.

Renewed interest in the classical gods, goddesses and myths brought cosmological iconography to the fore in statuary, frescoes, and painting. At the start of the fifteenth century, almost no images of the classical gods had been represented in painting or sculpture for a thousand years. By the end of the century, the gods decorated the palaces, gardens, fountains and tapestries. When searching for inspirational themes for decorating walls and ceilings,

[455] McClusky 188

astronomical imagery became a most popular choice. The sources for celestial representations were naturally found in *Aratea* manuscripts. The planetary gods and demi-gods of the constellations with their postures and attributes, kept alive in the books of the *Aratea*, were restored to a prominence not seen since ancient Rome. "The pagan divinities served as vehicle for ideas so profound and so tenacious that it would have been impossible for them to perish."[456] The illustrated *Aratea* manuscripts were an essential part of both monastic and noble libraries.

Fifteenth Century Libraries

Throughout the quattrocento, a passion for books generated manuscripts of the highest quality that were collected by civic and church leaders. This became the era of great princely libraries, as manuscripts were produced in enormous quantities for the numerous libraries in the wealthy cities and in papal and noble courts. Through all of Europe, the patronage of kings, dukes and cardinals, with their taste for splendor and display, resulted in the creation of splendid illuminated codices to awe and delight the readers. In the East as well, Sultan's libraries contained huge numbers of texts on astronomy, astrology, medicine and poetry. Federico da Montefeltro, the Duke of Urbino, was considered the greatest book collector of the fifteenth century, his library held an illuminated *Aratea* manuscript now at the Vatican.[457] The library of the Dukes d'Este, (Biblioteca Estense) now in Modena, was rich with astronomical and astrological manuscripts and with incunabula. One of the most beautiful books of this library, although untitled and anonymous, is a lavishly illustrated astrological manuscript from around 1450, commonly

[456] Seznec 149

[457] His library contained over 500 manuscripts in Latin, Greek and Hebrew. It is said he had thirty to forty scribes working for him for twenty years to create his extraordinary collection.

referred to as Este MS *De Sphaera,* Codex a.X.2.14=Lat.209.[458] Also found in the Biblioteca Estense is an early printed edition of Germanicus' *Aratea*.[459] It is illustrated with a series of xylographs representing the Signs of the Zodiac, a few planets, and the constellation cycle. The libraries of the Duke of Urbino and of Cardinal Matteo Barberini both had richly illuminated *Aratea* manuscripts. These treasures are now in the Vatican Library as well; in fact, of the twenty-five illustrated *Aratea* manuscripts that survive from the fifteenth century, eight are now in the Vatican Library. Furthermore, all but two of the twenty five were made in Italian workshops. A more in-depth look at six outstanding *Aratea* manuscripts will provide a better understanding and appreciation for the patrons, scribes and artists who kept this long-lived tradition thriving through the Middle Ages.

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[458] Its stylistic elements, plus the inclusion of the Visconti and Sforza coats of arms, are evidence that it was produced in Lombardy between 1450 and 1470. The manuscript is profusely illustrated, but its depictions of the 'seven planets' are especially colorful and creative. The full-page miniatures are dominated by the image of the planet as a god, but in human form, surrounded by a circular field of stars and a rainbow of spheres. Discs filled with little scenes symbolize the Signs of the Zodiac over which the planet rules. Each planet rules two Signs or houses, except the Sun and Moon which rule only one house. Below the over-powering planets are scenes of daily life depicting the 'children' or those groups who are influenced by each planet. The concept of each planet having 'children' is a later development of astrology. Perhaps this image softens the idea that the planets have power or control over humans. The scenes usually show the positive and negative qualities of the group types. There has been little scholarship in this area, except for a PhD thesis, *The Children of Venus in Late Medieval and Renaissance Iconography*, by G. A. Trottein, University of Illinois, Urbana, 1986.

[459] Bini 189-82 The early printed book was produced in Venice by Aldo Manuzio in 1499, it also included works by Firmicus, Manilius, and Proclus. The pictures of *Aratea* constellations are similar to the illustrations of the Hyginus text published in Venice by Erhard Ratdolt in 1482, which was also in the Biblioteca Estense.

4.3 DESCRIPTION OF SIX *ARATEA* MANUSCRIPTS

4.3.1 TWO NINTH-CENTURY *ARATEA* MANUSCRIPTS

4.3.1.1 First Ninth-Century *Aratea* - LEIDEN MS VOSS. LAT. Q.79

The two ninth-century *Aratea* selected for particular study are exemplary manuscripts created during the Carolingian era. They are commonly referred to as 'Harley Cicero' (British Library Harley MS 647) and 'Leiden Germanicus' (Leiden MS Voss. Lat. Q.79). Both manuscripts were created in the same area, between the eastern and western portions of the empire, later called Lotharingia. They were produced in scriptoria where Late Antique codices as well as excellent scribes and artists were available to create distinctive manuscripts for the elite, educated patrons who appreciated classical texts.[460] The miniatures found in both manuscripts, though entirely different in design, are outstanding for their artistic quality and ability to capture the essence of classical art. Their illuminations of the constellation figures exhibit authentic portrayals of the heroic figures of myth, and seem more in keeping with a society that 'venerated Jupiter than with one which worshipped Christ'.[461]

Although these are the two most widely-known and well-published *Aratea* manuscripts, it is essential to include them in this study, as they were among the first created and have been most influential. The examination and comparison of these two superior originals is required in order to

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[460] Bischoff (1994) 87

[461] Dodwell (1971) 23 He adds, "and they give surprisingly authentic representations of the heroic gods and nubile goddesses of Antiquity". As an example, the author selected a miniature of Andromeda, who was not a goddess, but an unfortunate princess.

gain a fuller understanding of the whole tradition, as they were copied over and over throughout the Middle Ages. Their influence can be detected even in the miniatures of many later manuscripts of the *Aratea* that are not direct copies, and in complementary astronomical writings as well. The Leiden *Aratea* in particular, designed at the court where the goals of the Carolingians were defined and implemented, expresses many of their cultural and political aspirations.[462]

State of the Literature

As mentioned, the Leiden *Aratea* of Germanicus (hereafter MS Leiden) has received the most attention in scholarly literature. The numerous books and journal articles in which it has been discussed have already been listed in Chapter 1; therefore it is not necessary to repeat them here.

History of the Manuscript

As the earliest surviving manuscript of the translation of Aratus' poem by Germanicus, MS Leiden has been dated to the 820's or 30's, and is considered one of the most important manuscripts prepared during the Carolingian era. Fortunately MS Leiden has been carefully preserved and survives in excellent condition. It is a rather small book when compared to the enormous religious and encyclopedic volumes that were being produced in the numerous Carolingian learning centers. In order to establish where manuscripts were produced, specialists compare the types of writing and book decoration, and also search for evidence in other religious or historical texts that the manuscript may provide. Since MS Leiden possesses none of these telling clues, nor any idiosyncrasies to indicate its exact place of production, it has been difficult

[462] MS Leiden is also listed in Appendix B, page ##.

for historians to specify exactly where it was created.[463] MS Leiden had formerly been assigned to Reims, but "it is the much more exclusively antiquarian element which distinguishes the court manuscripts from those of Reims, where the classicizing forms have been touched by the expressive style characteristic of the school."[464] Therefore Reims can be excluded, and MS Leiden has been allocated to the Lotharingian domain of the Empire.

MS Leiden does possess a personal dedication: "Vale fidens in domino Christi vestitus amore" indicating that it was addressed to a noble patron, but unfortunately the addressee is anonymous. The dedication and the care lavished on the text and illustrations, assure that it was created for a person of highest standing with an interest in classical learning. Art historians have suggested that possibly the poem was copied for the royal court of Louis the Pious, or perhaps Lothar I, his eldest son[465]; and others have proposed that Empress Judith, the wife of Louis the Pious, may have been a possible recipient. Judith was the mother of Charles the Bald, considered the most intelligent Carolingian emperor and who was also a great bibliophile.[466] Scholars have suggested that the extensively decorated *Utrecht Psalter*, created between 816 and 835, may have

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[463] Mütherich (1976) 69

[464] Mütherich (2004) 109 In her study of Carolingian manuscript illumination in Rheims, Mütherich defines the various periods of production in that famous center of spectacular Gospel Books and illusionistic painting. "It was considered the home of copies of classical cycles of illustrations, whose faithful reproduction of Late Antique miniatures is a splendid page in the history of Carolingian manuscript illumination, particular, those of the two most famous of these, the Leiden *Aratea* and the Bern *Physiologus*." "Carolingian Manuscript Illumination in Rheims" in *Studies in Carolingian Manuscript Illumination*. (2004) pp.302-340 Further study by Wilhelm Koehler and Carl Nordenfalk clarified and rectified the attribution of many manuscripts, the Leiden *Aratea* was allocated to the Lotharingian domain. (Koehler and Mütherich, Die karolingischen Miniaturen, 4. Die Hofschule Kaiser Lothars. Einzelhandschriften aus Lotharingien. Berlin. 1971)

[465] Mütherich (1976) 69

[466] Schutz 95 Louis and Judith were married in February 819, after the death of his first wife. Louis was greatly enamoured of Judith as she was quite beautiful and intelligent, admired for her knowledge and wisdom. "Walahfrid Strabo, tutor to Charles the Bald, pays respect to Judith in his poem, *De imagine Tetrici*, comparing her to famous women from the Old Testament, as a person of extraordinary learning and wisdom." When Louis lost favor, she was sent to a convent, but later they were both restored to their former power.

been made for Empress Judith as well.[467]

Creator of MS Leiden *Aratea*

Because MS Leiden manuscript is so true to its Classical prototype, has no colophon, nor includes any other writings, it provides no conclusive evidence, but only hints as to the identity of the patron, compiler or producer. But historians now point to the anonymous and mysterious court chronicler of Louis the Pious, who wrote a biography of Louis, which incidently exhibits a strong interest in the stars and planets.[468] This same anonymous person also composed a treatise pertaining to the stars and wonders of the heavens. To this day, the scholarly court biographer and author still remains unidentified, in the literature he is simply called 'the Astronomer'. Surprisingly, this nameless scientist was first uncovered and written about in the seventeenth century by Johannes Kepler, who was himself a historian of science, as well as court mathematician, astronomer and astrologer.[469] There is no conclusive evidence to confirm that 'the Astronomer' had anything to do with MS Leiden, but it is tempting to consider that he may be involved with the original creation of the manuscript for several reasons. 'The Astronomer's' interests coincide quite closely with those of MS Leiden, and he had the technical knowledge to compile the text and coordinate the illustrations, plus he was on the scene at the right time.[470] Another strong hint that the person responsible for the creation of MS Leiden was an astronomer,

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[467] Schutz 268

[468] Mütherich "Book Illumination" 107 Anon., *Vita Hludovice Imperatoris*, 63 (Ausgewähle Quellen zur deutschen Geschichte des Mittelalters. Freiherr vom Stein-Gedächtnisausgabe, 5: Darmstadt, 1968), 378 Einhard is another candidate, he left the court in 830, and other possible compilers are Gerward, his successor, Grimald, or Walahfrid Strabo.

[469] See "Kepler as Historian of Science: Precursors of Copernican Heliocentrism According to *De revolutionibus*, I, 10." in Eastwood, *Astronomy and Optics from Pliny to Descartes*, London 1989.

[470] Mütherich, "Book Illumination" 117

is the inclusion of the controversial planetary diagram at the end (this will be discussed in 4.3.5). Circumstantial evidence points to 'the Astronomer' as the ninth-century scholar and antiquarian to whom we owe this masterpiece.

Provenance

The known provenance of MS Leiden manuscript also demonstrates its value. Almost surely it was still in northern France, at the monastery of Saint-Bertin at Saint-Omer, at least in the early eleventh century, since it was copied there twice during the abbacy of Odbert (986-1008). The whereabouts of the manuscript are unknown until 1573 when it was bought from a painter by Jacob Susius/Suys (1520-1596) of Ghent, which is inscribed on the flyleaf. Later it appeared in the library of an editor and bibliophile, Hugo Grotius (1583-1645), who published a scholarly edition and had the miniatures copied for his *Syntagma Arateorum*, Leiden,1600. In 1648, the books of Grotius, including MS Leiden, became part of the library of Queen Christina, of Sweden (1626-1689). Following her abdication in 1654, her codices were sent to Antwerp where Isaac Vossius (1618-1689) started making an inventory of her collection. He rewarded himself for this work with a number of her books, including MS Leiden. After the death of Vossius in 1690, his heirs sold his books to Leiden University, its present home.

Leiden Text

One of the greatest achievements in book production during the Carolingian renewal was the implementation of a uniform script that had been perfected at the monastery at Corbie.[471] The introduction of the Caroline minuscule, a flowing cursive style, enabled manuscripts to be written

[471] M.P. Brown and P. Lovett, *The Historical Source Book for Scribes*, Univ. of Toronto Press, 1999, p. 67

and read more rapidly by using the more legible script. But this Carolingian innovation was not adopted for MS Leiden textual material, instead the verses of the *Aratea* were written in a narrow and condensed type of rustic capital, which was more expensive to produce and reserved for only the most luxurious works. Like its Late Antique illustrations, this type of text too looks back to earlier codex traditions.[472]

The text of MS Leiden is principally that of Germanicus, but his verses were supplemented in some sections by portions of Avienus' more detailed descriptions. Also on the folios are some textual additions in the hands of several later owners. In the late thirteenth or early fourteenth century, someone carefully recopied the *Aratea* text in a Gothic book hand in the upper and lower margins of the book.[473] The original lines of text are written in red; the first letter of each line is enlarged and moved a little to the left. The lines recopied by a later reader follow the same layout, but are written in black ink. In 1600 the text was first edited and commented on in print by the young Hugo Grotius, mentioned above, and the illustrations were copied by Jacob de Gheyn (d.1629), one of the best engravers of his time. The palaeography of MS Leiden *Aratea* text has been analyzed by Bernard Bischoff.[474]

Style, Placement and Iconography

Although it is not possible to know the exact sources of the illustrations, the constellation

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[472] The rustic capital had been developed in ancient Rome, based on lettering used for inscriptions that were carved in stone; the distinctive shape of each letter derives from the process of carving in stone with a chisel. Another famous example where the rustic capitals were purposely used to give a manuscript an antique appearance is the Utrecht Psalter, copied from an Early Christian exemplar. The numerous later versions of the Psalter did not copy its labor-intensive rustic capital script.

[473] The additional text continues on all pages until f. 81, except for f. 74v.

[474] Bischoff, *Aratea. Kommentar zum Aratus des Germanicus, MS Voss. Lat Q.*, and referred to also in his *Manuscripts and Libraries in the Age of Charlemagne.*

miniatures of MS Leiden *Aratea* definitely reflect their fourth or fifth century exemplars, perhaps even a Late Antique manuscript of Germanicus' poem.[475] In MS Leiden, the Carolingian illuminator has assimilated to a great extent the antique illusionist style of his exemplar, faithful to its format, technique and manner of painting. The emphasis of the book seems to be its pictorial content, as the illuminations are much larger than other ninth-century examples, such as Madrid, BN Codex de Metz 3307 (ca. 840), that are merely inserted 'papyrus style' between the sections of text. The concept of separating the text and image and then to enlarge each picture to the size of a whole folio was revolutionary.[476] In many astronomical texts, the pictures are added merely to illustrate the text. Here it seems that the text is secondary, an aid for a clearer understanding of the full-page pictures. But the text and picture cycle serve as close companions, each complimenting, clarifying and completing the other.

MS Leiden contains ninety-five leaves with thirty-nine illustrations of the constellations, as well as the four seasons and five planets, the last two folios are blank. The constellation cycle is almost complete except for five lost miniatures: Virgo, Libra (which is often omitted), Centaurus, Jupiter, and the Sun and Moon together, all were missing in 1600. An image of Jupiter astride a large eagle was traditionally included at the start of Germanicus *Aratea* manuscripts, as he was honored by a hymn to Zeus in Aratus' poem, and mentioned briefly in the opening verse of Germanicus.[477] The missing Sol and Luna illustrations appear in its copies.[478] The same format

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[475] Verkerk 261 He argues that because the text includes sections of Avienus' poem, its model must date to the fourth or fifth century. He adds, "Thiele thought that the finishing touches were only added to the revision of the text in the ninth century by the Carolingian scribe."

[476] Weitzmann (1971) 97

[477] "*Ab Ioue principium magno deduxit Aratus carminis*". LeBoeuffle

is used throughout MS Leiden; each illustration follows the poetic description of the constellation in matching order. Every miniature is enclosed in a simple red border, framing each individual constellation as though an independent painting. The background of the constellations exhibits a solid tone, as deep blue as the evening sky, decorated with round or squared stars accented with gold. The artist shows no interest in accuracy in the placement or numbers of the stars in any of the illustrations, they are simply sprinkled about the figures.

The position of the figures, animals and objects conform to the traditional classical designs of the constellations without a shred of Christian imagery. The only concession to religious influences would be easily missed, the tiny crosses placed atop the small hats of Gemini.[479] The Twins are eyeing each other, holding attributes; they appear with capes, caps and sandals and nothing in-between. Following the prototypes of earlier illuminators, Carolingian artists were able to portray the human bodies and animal figures in a realistic, three-dimensional manner with fore-shortening and modeled with white highlights. The extended limbs of the royal family, Cepheus, Cassiopeia, and Andromeda seem to be frozen in their frames, just as the stars, which they embody are fixed forever in the sky. Weitzmann states: "The semi-nude Andromeda in a relaxed pose derives from a very good classical model which seems to have been copied so faithfully that the style of the model still shines through. Not only is a frame added, but this frame cuts through the rocks, thus giving the illusion that the rocky landscape continues beyond the limitations of the picture frame. MS Leiden miniature gives the impression of a spatial landscape

[478] The *Aratea* manuscript at Boulogne-sur-Mer reproduces the lost miniatures of the Sun and Moon on fol. 32v. Thiele has suggested that a Luna miniature was formerly visible on a lost folio 81.

[479] The iconography of Gemini and other constellations is discussed in Appendix B.

as if seen through a window, the blue ground adds to this illusion. The addition of a landscape setting was one of the effective means of raising miniature painting to a higher artistic level".[480] The constellations of Sagittarius and Hercules too stand out from the royal blue ground retaining their usual postures, both adorned with animal skins. The Late Antique prototype may have even been a cluster of four separate images on one folio as in the Quedlinburg Itala [481]

As mentioned in Chapter 2, there are two different conventions for representing the figures of the constellations, both perspectives are found in the miniatures of MS Leiden. The ancient convention of drawing the human figures from the back survives in MS Leiden, where some figures face forward and some are reversed. Of the thirty-nine constellation images, eleven are clearly derived from a celestial globe; the others are oriented as if viewed in the sky from Earth. Serpentarius, Perseus, and Orion show us their back side, while Aquarius, Cepheus, and Eridanus are drawn as if they are in the sky looking down on the observer. Numerous characteristics of the illuminations present evidence of an earlier prototype.

Therefore it is not difficult to conclude that MS Leiden is a faithful copy of one, or perhaps several, Late Antique Germanicus manuscripts. This manuscript in turn provides important evidence relating to the content and appearance of a lavishly illustrated fourth-century book. There are four close copies of MS Leiden: two manscripts and two printed versions. Of the two printed editions, one was made in 1600 by Hugo Grotius for his *Syntagma Arateorum* and the other is a copy of Grotius' version published in 1661 by Adreas Cellarius for *Harmonia*

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[480] Weitzmann (1971) 97-98

[481] Quedlinburg Itala, Deutsche Staatsbibliothek, Berlin, DDR, Cod. Theol.lat.folio 485, (early fifth century) as per Prof. Stones.

Macrocosmica. The two illustrated manuscripts are discussed in section 4.3.6.

The Planetary Configuration

At the end of MS Leiden on folio 93v, a puzzling planetary diagram appears, completely out of context. This diagram is a ninth-century original creation, although it could have been modeled on a similar type of diagram for Late Antiquity. It comes from an entirely different tradition than the type of celestial map that often accompanies *Aratea* manuscripts described in section 4.1.4. This diagram has no direct relationship with the poem, since it depicts the spheres of the planets, and the planets are barely mentioned by Aratus nor by Germanicus. It is not inserted later, as it is written with the 'self-same ink' as the rest of MS Leiden.[482] Even though unexpected, the diagram is compelling in its design with many amazing features. The first thing that draws your attention is the organization of the planets. Usually diagrams of the planetary system show a centrally-placed Earth with the planets properly arranged in perfectly circular orbits enclosing it. But this diagram shows Mercury and Venus in orbit around the Sun, rather than the Earth. This is essential documentation for the history of astronomy since it proves that the partial heliocentric theory of the ancient Greeks was still circulating many centuries before Copernicus. The planetary arrangement is stunning evidence as noone in the Middle Ages was supposed to be aware of the heliocentric theories of Heraclitus until it was published by Copernicus in the 16th century.[483]

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[482] Verkerk 260

[483] Martianus Capella and Macrobius both quoted the theories of the ancient Greek astronomer, Heraclitus, that because Mercury and Venus are never far from the Sun, that indicated they orbit the Sun, not the Earth. The theory was little noted and this arrangement does not appear in any other medieval diagrams that I have seen, except for the close of copy of MS Leiden, Boulgne-sur-Mer MS 188; the other copy, Bern 88, did not include it.

The second surprise of the diagram is that the planets are not randomly placed, but each is purposely aligned to a particular Sign of the Zodiac. By studying the placement of the planets pictured on the diagram, it is plain to see that it is actually a map of the sky as it was oriented on one particular night. Historian, Bruce Eastwood, had recognized the significance of this diagram, and had determined and published the date as March 28, 579.[484] The date has since been re-examined by R. and M. Mostert and re-fixed at March 18, 816.[485] My computer-based investigation of the planetary placements agrees with the the later date the actual location of the planets on that date. In order to verify that the diagram had not been copied from a Roman prototype, I checked the positions of the planets back to 100 BCE. There is no other time when the planets would be even closely aligned to those in MS Leiden configuration.

The third surprise found in the diagram is its technical sophistication. Written in small print around the circular orbit of each planet are Latin quotations derived from Pliny the Elder. These inscriptions state each planet's point of nearest approach to (apogee) and furthest point from (perigee) the Earth. The writings also state the exultation of each planet, indicating where it was believed to have the greatest astrological influence. Whoever designed the diagram of the planets was very familiar with astronomical theory.

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[484] Eastwood, (1989) *Aratea, Kommentar zum Aratus des Germanicus, MS Voss. Lat. Q.79* IV 1- 40, (1983) "Leiden Planetary Configuration", reprinted in 2002. Eastwood was not the first to publish the heliocentric features of this configuration, he credits Marie-Thérèse d'Alverny, "Survivances du 'système d'Heraclide' au Moyen Age" *Avant, avec, après Copernic* (Paris 1975) 39-50, for noting the 'peculiarities of its heliocentrism'. She attempts to place it in a tradition of heliocentric ideology. Thiele was the first scholar to publish information on the diagram in 1898, in *Antike Himmelsbilder*, p. 77 and 90, but he does not mention the heliocentrism. Eastwood corrects the date in "The Astronomies of Pliny..", (1993) p.173.

[485] Mostert M. and R., (1990) pp. 248-261 They determined that the probability that all the planets were chosen at random, and that they happen to align at this time, is one day in 7 million million years.

This type of diagram showing the position of the planets is normally called a planetarium. A planetarium illustrates the motions of the sun, moon and planets, or sometimes the planets alone, in their daily round through the zodiacal signs. Since that is not exactly what is being shown here, Eastwood suggests giving this diagram a more neutral and improved label - a 'planetary configuration'. We have many horoscopes from antiquity, but this is the earliest surviving example of a diagram showing the configuration of planets for one particular day. Why did someone in the early ninth-century take such great care to record this astronomical date and insert it in MS Leiden manuscript? Who would have had access or permission other than the creator? What was the significance of that date? The Mostert article offers several suggestions, the most likely is that it was the date that the manuscript was completed or presented to its noble patron. There were no unusual celestial events, comets, eclipses etc. at that time, nor any outstanding historical events, births or marriages. I propose that the date, March 18, was purposely selected because in the Middle Ages, March 18 was thought to be the date of the creation of the world, a date promoted by Bede. Why did they specify March 18? According to Genesis, the stars were created on the fourth day.[486] The vernal equinox, March 21, was traditionally considered the start of the celestial year, count back to the fourth day and March 18 would be the date of creation. Why the year 816 was chosen is open for discussion.

This diagram holds even more surprises; the tiny illustrations of the planets and Signs of the Zodiac have been shown to be copied from the *Calendar of 354*, discussed in Chapter 2. The

[486] Genesis 1.14, *The Holy Bible*, translated from the Latin Vulgate, Douai-Rheims. 1609 "And God said: Let there be lights made in the firmament of the heavens, to divide the day and the night; and let them be for signs and for seasons and for days and years.. (19). And the evening and morning were the fourth day".

iconography of the planets and Signs has been discussed repeatedly in art history literature. In addition to the planets in their spheres, the twelve Signs of the Zodiac are pictured in the outermost band of the fixed stars. The Labors of the Months are placed between the Signs, each in a small golden medallion. These personifications and those of Terra and the seven planets show a great similarity to early Christian and Roman renderings. A study by Thiele published in 1898 has demonstrated that these tiny figures are based on the famous *Calendar of 354*, discussed in Chapter 2. The Carolingian copy of the *Calendar of 354*, which is also lost, was probably made during those same years that saw the production of the Leiden and other *Aratea* manuscripts. The connection of the Leiden and the *Calendar of 354* is more evidence of the classical interests of the Carolingians.[487]

The zodiacal signs begin with Aquarius in January at the uppermost point (or mid-heaven), but the cycle does not correspond with the Labors since they proceed in opposite directions. The diverging directions of the zodiacal and Labor cycles and the stylistic differences among the illustrations in MS Leiden point to a variety of iconographic sources. Salzman has also published an extensive study comparing the illustrations in the copies of the *Calendar of 354* with those in the planisphere from the Leiden with its two copies.[488] She discusses the literature concerning these illuminations beginning with the 1898 study by Thiele, and states her reservations concerning the positive relationship between the images and the *Calendar of 354.* Salzman affirms the figures in Leiden diagram "should not be considered a completely

[487] This relationship is discussed by Stern, *Le Calendrier de 354*; M. Salzman, *On Roman Times*, and von Euw, "Die Bilder des Leidener Aratus".

[488] Salzman 263-68

trustworthy reproduction of the illustrations of the months in the original Calendar unless corroborated by other manuscript or archaeological evidence."[489]

An exact copy of the planetary configuration in MS Leiden is retained in its copy, Boulogne-Sur-Mer BM MS188, but four smaller diagrams have been added in the corners. The printed copy edited by Grotius, *Syntagma Arateorum*, and its copy published by Cellarius, *Harmonia macrocosmica*, have both retained the planetary diagram. A slightly different celestial diagram appears in the other copy of MS Leiden, Bern, Burgerbibliothek MS 88, folio10v. More detailed information on MS Leiden and its copies appears in Appendix B.

4.4 SECOND NINTH-CENTURY *ARATEA* - BL HARLEY MS 647

London BL Harley MS 647 (hereafter MS Harley) contains the oldest and largest fragment of Cicero's translation of the *Phaenomena* of Aratus. MS Harley is larger in dimension than MS Leiden, but is incomplete and has fewer pages, only twenty-one folios with twenty-four miniatures, compared to MS Leiden which is composed of 101 folios with thirty-five miniatures.[490] The designs of MS Harley's constellation images are altogether different than the format of the constellations in MS Leiden. The variety of illustrations appearing in these two manuscripts, plus the variations seen in other ninth-century astronomical anthologies, reflect the richness of Late Antique sources available to Carolingian artists. Whether found in codices,

[489] Salzman 268
[490] The complete list of miniatures contained in MS Harley is found in Appendix B, page ##.

scrolls, globes or mosaics, the plentiful models for astronomical illustrations are an indication of how imagery of the constellations and Signs of the Zodiac can 'hint at a complex ancient tradition in addition to that of the texts'.[491]

State of the Literature

MS Harley is discussed by C.R. Dodwell[492], in which he examines the role of astronomical manuscripts in the development of Romanesque art in England after the Conquest. He cites the illustrative cycle of the *Aratea* manuscripts as the most popular source of mythological figures from which medieval artists drew inspiration. He gives credit to Cicero's translation as the primary channel from 'both the literary and artistic point of view'. This seems to be the case in England, as the influential Harley Cicero manuscript and its copies were reproduced there numerous times, and England seems to be the primary channel for Cicero's text. Actually throughout continental Europe, many more manuscripts of Germanicus' translation and its derivative textual forms survive. But the reverse is true in England where six manuscripts of Cicero are extant, compared to just three of Germanicus, all later arrivals. This relatively brief manuscript has been studied thoroughly; the numerous articles in which MS Harley is cited can be found in Chapter 1, and will not be repeated.

History of the Manuscript

MS Harley is basically an abbreviated picture book with two sets of text added; the design of both the text and images are of purely classical character. Like MS Leiden, it was produced in Lotharingia, for another or possibly the same royal patron. MS Harley is thought to have been at

[491] McKitterick (2000) 21 Many of these were discussed in earlier chapters.
492 The Canterbury School of Illumination, 1066-1200, Cambridge University Press (1954)

Fleury in the early tenth century, later it was taken from France to England possibly as early as the second half of the tenth century.[493] How Harley arrived in England is a matter of speculation. Manuscripts were often transferred to other centers specifically for the purpose of making copies of them. Through such exchanges many Carolingian books were carried to English centers such as Canterbury and Ramsey from French monasteries such as Fleury and St. Bertin. It is thought that a large number of manuscripts reached English libraries through monastic educational reforms associated with Flanders and Cluny in particular. England had close contacts with Europe in the ninth and tenth centuries, not only between monastic centers, but also among the royal courts. For example, the daughter of Charles the Bald, Judith, was married to Aethelwulf, King of Wessex in 856, another possible source for the transfer of the famous picture book. MS Harley was most probably at St. Augustine Monastery, Canterbury, in the late tenth century, as it was copied there several times. At least five manuscripts that show the influence of MS Harley exemplar were made in English monasteries.

Harley Text

Although MS Harley contains the largest portions of Cicero's version of the poem, it is still incomplete. Since Cicero's text was fragmentary and contained few details about the stars or the myths, it was supplemented with scholia which were derived mainly from a manuscript of Hyginus' *De astronomia*. The additional mythological and astronomical texts contained the legendary tales along with particular information about the numbers and positions of the stars. In

493 Saxl ("Illuminated Science Manuscripts") 105 As proof that MS Harley was in England at that time, Saxl reports that the first page of MS Harley was apparently lost, and was replaced by an English hand in the second half of the tenth century.

addition to lines of text from Cicero and Hyginus, MS Harley 647 also contains excerpts from Pliny the Elder.[494] As a result, MS Harley has two separate sets of explanatory text associated with each constellation image. One large constellation figure appears on each folio and the appropriate verse of Cicero's *Aratea* is written at the bottom of the page. The text is written in Caroline minuscule in the typical verse format; the first letter of each line is enlarged and set apart, written in dark brown ink, the rest of each line is in red.

The scholia derived from Hyginus, with the myths and descriptions of each star group are written in rustic capitals, composing the body of each illumination. MS Harley shows various corrections on almost every line of the text, which implies comparisons with another manuscript, and it has been suggested that these were made by Lupus of Ferrières.[495] However Mütherich claims it was not Lupus who wrote the corrections and additions in MS Harley, as they were written in a 'northern French hand of the second quarter of the ninth century'.[496] MS Harley also has some Anglo-Saxon script added in the Signs of Scorpio, Sagittarius, Aquarius and Pisces. The exact stemma of the many *Aratea* manuscripts of Cicero, along with the precise text sources, has been worked out by J. Soubiran.[497]

Style, Placement and Iconography

Like MS Leiden and many other Carolingian illuminations, the miniatures of MS Harley

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[494] Reeve 23 The excerpts from *Natural History*, Chapter 18 appear on ff.16r and 16v; and more excerpts from Plinys's Chater 2 *Natural History*, Chapter 18 on 18v-20r.

[495] This connection was discussed in Chapter 2. Lupus of Ferrières wrote to Prüm in 847 asking to borrow a copy of their 'Tullius in Arato' to complete his own exemplar. The closeness of Prüm to Aachen suggests a relation between the manuscript to which Lupus refers and MS Harley Cicero.

[496] Mütherich, "Book Illumination in the Court of Louis the Pious", 107 But that does not eliminate Lupus, as he lived in northern France at that time.

[497] *Cicéron: Aratea Fragments Poètiques*, ed. Jean Soubiran

are also illusionistic, looking back to their Late Antique prototype. According to Saxl the illustrator of this manuscript "comes nearer to classicism" than does the artist of MS Leiden Germanicus.[498] Because the initial sections of Cicero's *Aratea* are lost, the first constellation mentioned in Cicero manuscripts is Aries, which is about one-third through the original poem.[499] Consequently, the constellation images also begin with the Sign of Aries, f 2v in MS Harley. Unlike MS Leiden images, MS Harley miniatures have neither frames to enclose them, nor background colors to embellish them, and so the figures seem unanchored, as if floating in space. Each image covers about three-quarters of the folio and has a recognizable form, but only the heads, hands and feet are drawn in accurate detail. The extremities of each constellation are delicately modeled and the colors are softly muted. Even the lines of scholia gently curve to bring a more natural appearance to the human and animal figures, seen in the depiction of Cygnus the Swan, which is especially skillful with its long slender neck and wings tipped in black. This technique of manipulating the text to become the body of the figure is known as *technopaignion* (art game) and its origins can be traced to the patterned poems of antiquity that represented objects.[500]

Hyginus' writings indicate the exact number of stars found in each constellation; but only rarely do they match with those pictured. The stars are brightly painted with small red circles, but not accurately positioned, just randomly placed along the perimeter of the images. The stars are

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[498] Saxl ("Illuminated Science Manuscripts") 101 Saxl goes on to say "this fruit of late antique civilization is a little too fanciful; for if someone was interested in the text he can hardly have enjoyed reading it in this form. The English scribes and draughtsmen were therefore sensible enough to drop this mannerism fairly soon; they copied the figures and wrote the commentary in the blank spaces". "Belief in Stars", *Lectures,* 88.

[499] A listing of the constellations included in MS Harley is found in Appendix B.

[500] A. Grabar and C. Nordenfalk, *Early Medieval Painting*, (1957) 93

almost always placed outside the figure, so that they do not interfer with the text; but Aries and Cygnus each do have one placed in the text. MS Harley and MS Leiden both include a miniature of the planets and both are minimal representations, showing all five as just small heads in a composite grouping. The planetary gods are not entirely ignored, but their importance is reduced to a small-scale arrangement. In both manuscripts, the planets are all male, no Venus, and one of the busts of MS Leiden seems to be tonsured, each is encircled with a halo. The Four Seasons and the Pleiades are arranged in a manner similar to the planets. Folio 19 of MS Harley shows a planetary diagram. Folio 21 is blank, and folio 21v has the last image, a celestial diagram displaying all the constellation images, signed with the name of Geruvigus, which does not seem to be the scribe of the entire manuscript.

4.5 TWO TWELFTH-CENTURY *ARATEA* MANUSCRIPTS

4.5.1 First Twelfth-Century *Aratea* - COTTON TIBERIUS MS C. 1

In England, the twelfth century was noted as the greatest period for book production; their decorated codices were large in size, and high in quality with accurate, uncluttered scripts, although not all were illuminated.[501] Three of the four surviving illustrated *Aratea* manuscripts produced in the twelfth century were made in England: BL Cotton Tiberius C.I. (dated 1122); and two manuscripts in the Bodleian Library: MS 614 (first half 12th C.) and Digby MS 83 (mid 12th

[501] Kauffmann 16

C.), both of these are close copies of Cotton Tiberius B.V. All three English manuscripts are part of the first family of Cicero's *Aratea* and are fully illustrated. The fourth *Aratea* dated to the twelfth century is a Germanicus manuscript now in Madrid, Biblioteca Nacionale MS 19, also illustrated. Tiberius C.I was the first selected for particular discussion, as it retains the *technopaignion* technique, forming the figure with the words, which was inspired by its exemplar, the ninth-century Harley. This is the only English representative with that distinctive type of illustrations that survives from the twelfth century; in fact there is just one other *Aratea* of Cicero, Göttweig, Stiftsbibliothek Codex 7 Bl. 20 (15th C.) that has adopted this antique convention.[502]

State of the Literature

Literature: Catalogue of Manuscripts in the Cotton Library, London: (1802); Saxl and Meier Catalogue, 128-134; C. M. Kauffmann, *Romanesque Manuscripts: 1066-1190,* no. 37; A.G.Watson, *Catalogue of Dated and Datable Manuscripts*, p.107; N.R. Ker, 'Membra Disiecta', in *The British Museum Quarterly* 12 (1938); F. Saxl, 'Illuminated Science Manuscripts in England', *Lectures*, p. 102-08; H. Bober, "Illustrated Medieval Schoolbook of Bede's '*De natura rerum*'," Journal of the Walters Art Gallery, XIX-XX (1956-57) 77, 91; T.A.M. Bishop, *English Caroline Minuscule*, Oxford, (1971) 15; P.McGurk, *Eleventh-Century Anglo-Saxon Illustrated Miscellany British Library Cotton Tiberius B.V. Part 1, Together with Leaves from BL Cotton Nero D. II, Early English Manuscripts in Facsimile*, XXI. Copenhagen: (1983) 73.

History of the Manuscript

Cotton MS C.I, a copy of Harley 647, probably originated at Peterborough, England in

[502] Cotton Tiberius C. I is also listed in Appendix B, page ##.

1122. Little is known of its whereabouts until the late seventeenth century when Tiberius C.I was owned by the great book collector, Sir Robert Cotton, who had another copy of the *Aratea* of Cicero in his library as well, Tiberius B.V.

Text

The twelfth century saw the last flowering of Cicero's *Aratea* in England, as the popularity of the long manuscript tradition modeled on MS Harley seems to die out by the end of the century. Just one illustrated, but incomplete, *Aratea* manuscript of Cicero survives from the thirteenth century; this is Göttweig, Stiftbibliothek MS 146. None are extant from the fourteenth century. There is a slight flurry of renewed interest in the fifteenth century, but of the twenty-seven extant Aratean manuscripts, only five include any of Cicero's text. From these five, four merely have a few fragments of Cicero supplementing Germanicus' text. But surprisingly the fifth quattrocento Cicero manuscript, Göttweig Stiftsbibliothek MS 7 Bl.20, was made at Koster Göttweig, and was modeled on Cicero's Harley 647. This manuscript has revived the format of the Carolingian exemplar in its illuminations, imitating the presentation of the scholia of Hyginus written inside the bodies of the constellations.

Tiberius C.I is comprised of a collection of astronomical works; in addition to the large fragments of Cicero's *Aratea* with scholia, are writings by Macrobius, Bede, Abbo, Martianus Capella and others. It also contains some Christian liturgical texts and a variety of religious writings, including the formula for excommunication from Pope Leo IX. The first few pages are a potpourri with ecclesiastical computus from around the year 1107, several diagrams and charts

with a *Sphere of Pythagoras,*[503] plus a discussion of the twelve Signs of the Zodiac. The writings of Cicero first appear at the top of folio 20v, "*Ex opera Ciceronis de Astronomia*" is written in red, most of the text is written in black ink. The text based on Cicero's *Aratea* is found at the bottom of the page, but is no longer arranged with one line for each poetic verse; it has been modified to Cicero's scholia and is written continuously as prose. The first line reads, "*e quibus hunc subter possis cognoscere fultum*", which corresponds to line 229 in Soubiran. The first letter of each descriptive paragraph is enlarged and decorated. Like MS Harley, Tiberius C.I has two sets of writings, the text of Hyginus is arranged to form part of the illustration, sometimes filling in the body and sometimes forming an architectural setting. The lines of Hyginus scholia that fill the figures in Tiberius C.I are straighter, stiffer and clumsy compared with the graceful, curving lines of text seen in MS Harley and the figures are outlined in ink. The rustic capitals used in the text of the original were not retained; lower case letters were used instead.

Style, Placement and Iconography

The astronomical drawings in Cotton Tiberius C. I, like the textual arrangements, are a close copy of MS Harley 647. When compared to its exemplar, the general format of Tiberius C. I is similar; but there are differences in the execution. The constellations are drawn with definite outlines; the text within the images is extensive and overdone (almost choking the figures), written with a firm hand that overwhelms the whole folio. In comparison, the text within MS Harley constellations is more subtle and balanced. The extremities of Tiberius C.I constellation figures are simplified and color was dispensed with entirely; the faces show no modeling or

[503] The *Sphere of Pythagoras* is similar to the *Vita Mors* diagrams the divine the prognosis of an ailing patient. The auspicious numbers predict recovery, the negative numbers predict death.

shading, nor the illusionistic manner of its exemplar. The ninth-century Harley stands out in its superiority when matched with its twelfth-century imitator.

As in most versions of Cicero's *Aratea*, the first illumination in Tiberius C.I is the Sign of Aries, which appears on folio 20r before the start of his text. The depiction of Aries is out of the ordinary, as the Ram is not standing upright, but lying with its feet toward the gutter of the manuscript, Pisces too has the bottom of the fish pointing to the gutter. The remaining constellations are drawn in the upright positions. A total of twenty-five miniatures of the constellations accompany the text, continuing until folio 31v, followed by an image of the five planets on folio 32.[504] The illuminations mostly appear at the top of the folio with Cicero scholia at the bottom. This total is about one-half the number usually found in Germanicus' *Aratea*. Tiberius C.I, like most Cicero manuscripts, is missing the colorful characters, such as Cepheus and family, Pegasus, Boötes, Hercules, Auriga, and Serpentarius.

After the cycle of constellations, on folio 33v is an unusual full-page depiction of Sol and Luna that does not appear in MS Harley or within any *Aratea* manuscripts that I have seen. This non-traditional portrayal of the Sun and Moon has no text and is reminiscent of an ancient chariot race with Luna in the lead. A full-figured Helios stands within his chariot holding a whip and the reigns of four horses all pulling to the right. His cape is flowing and strong rays of light project from his head. The cloak of Luna billows over her head and she holds two long flaming torches. She also stands steering her cart pulled by two oxen. The depictions of the Sun and Moon have classical references and are not uncharacteristic. The fact that they are sketched close together and

[504] The constellations included Tiberius C.I are listed in Appendix B.

not set apart in any way by a framing devise is not often seen. In addition, personifications of the four winds and the four seasons, shown as small heads, are aligned along the upper margins of the picture. These iconographic features indicate that the scene was borrowed from a different manuscript tradition, perhaps Bede. The individual stars were introduced into the figures as in MS Harley, mostly round dots scattered along the outlines of the bodies, but occasionally placed amidst the inner text. The numbers of stars is always stated in the text, but rarely agrees with the number drawn on the figures.

The second twelfth-century manuscript was also made in England and has the text of Cicero, but its design and illustrations are quite different. The two manuscripts were made about the same time in English monasteries, but obviously the scribes or patrons had a choice in the arrangement of the folios and the type of constellation images they could include in their codices.

4.5.2 Second Twelfth-Century *Aratea* - BODLEIAN LIBRARY MS 614

My first choice from among the remaining three twelfth-century *Aratea* manuscripts was Madrid BN, MS 19 produced in Italy at Monte Cassino. It carries the Germanicus text and comes from a completely different tradition than the Cicero Tiberius C.I, and the English family of manuscripts based on Harley 647. But unfortunately little has been published on MS 19, and it survives in a very deteriorated condition. No one is permitted to handle it, and the microfilm is unreadable. The next choice is a manuscript now at Oxford Bodleian Library, MS 614, (hereafter Bodl.614) mid-twelfth century, which is very similar to the other English *Aratea* at Oxford, Digby MS 83, made in the last quarter of the twelfth-century. Both Bodleian *Aratea* manuscripts are

modeled on BL Cotton Tiberius B.V, an early eleventh-century *Aratea* of Cicero. Bodl. 614 is the next Cicero version that we know was produced after Tiberius C.I.[505]

State of the Literature

Literature: E. Panofsky and F. Saxl, 'Classical Mythology in Medieval Art', *Metropolitan Museum Studies, IV* (1933) 238, 240-1; M.R. James, *Marvels of the East*, (1929); J.C. Webster, *The Labours of the Months in Antique and Medieval Art*, (1938); Saxl and Meier III, xxvi, xxviii, 313-16; Saxl, 'Illuminated Science Manuscripts', and 'Belief in Stars', *Lectures I*, (1957); E. Panofsky and F. Saxl, "Classical Mythology in Medieval Art" (1933) 238; J. J. G.Alexander, and Elzbieta Temple, *Illuminated Manuscripts in Oxford Libraries, the University Archives, and the Taylor Institution*. Oxford: Clarendon Press (1985); C.M. Kauffmann, *Romanesque Manuscripts, 1066-1190*, London: Harvey Miller (1975) 16.

History of the Manuscript

The two twelfth-century Bodleian manuscripts are the last of the English constellation cycles to descend from Harley 647, and the last books to contain the popular astronomical texts, before the large-scale penetration into the Latin West of Arabic and Greek science. Traces of these influences can be seen in these books, as they already contain the Arabic names of the stations of the moon, plus Hebrew and Arabic names of the planets. Saxl has also pointed out that these Bodleian manuscripts are the first medieval Western manuscripts to include a reference to astrological theory.[506] These manuscripts have textual additions, including more exotic information not available in Tiberius B.V. As Saxl states concerning Bodl. 614, "It contains a

[505] Bodl. 614 and its complete miniatures are listed in Appendix B, page ##.
[506] Saxl, "Belief in Stars", in *Lectures* 88

number of Arabic words, and there is evidence to show that the compiler intended to supplement his traditional book of stars with another one explaining how to foretell a person's future from the stars. The author must therefore have been familiar with Spanish texts dependent in turn on Arabic sources".[507] Its place of production is undetermined.

Text

This astronomical compendium has seventy six folios, and opens with a list of the months on folio 1, it continues with the calendar pages that show a few illustrations of the Labors of the Months, followed by computus charts. The Cicero *Aratea* fragments with *Scholia Strozziana* and *Sangermanensia* begin on folio 10. Like its prototype, Cotton Tiberius B.V, there are excerpts from Hyginus, Pliny, Isidore, Bede and Abbo of Fleury, and it also contains an illustrated *Marvels of the East*. The text is no longer completely Cicero's, but a new compilation of several sources mainly from Hyginus and even Germanicus scholia. Saxl contends, "Neither an astronomer nor a modern philologist would give high praise to the author of this treatise".[508] Astronomical texts of the twelfth century often depended on the traditional transmissions from early sources, but this opens to a greater variety of writings made available from Arab libraries. The text of the *Aratea* manuscripts continues to degenerate from the pure poetry of the original Latin versions to just small bits inserted between the scholia. Like Tiberius C.1, the Bodl. 614 text has lost the poetic form entirely with just a few fragments of verse surviving. But the alternating rhythm between the astronomical text and the constellation illustrations continues its symbiotic relationship, maintaining close associations. The opening words that begin the astronomical writings are: "*Sol*

[507] Saxl, "Belief in Stars", in *Lectures* 88
[508] Saxl, "Illuminated Science Manuscripts" in *Lectures* 108

du igne natura fre", written before the illumination of Helios.

Style, Placement and Iconography

The illustrations of both Bodleian manuscripts are in the tradition of Anglo-Saxon codex, Cotton Tiberius B.V, but are not a direct copy. The arrangement of the Bodl.614 illustrations is different than the usual Germanicus format. The *Aratea* section opens with an illustration of the Sun and Moon on the same folio but each in its own compartment. The standing figures are pictured in their chariots; a naked Helios holds a staff with a flag with his right hand and the reins with his left. A fully-clothed and veiled Luna holds the lunar orb instead of a torch, and a crescent moon appears behind her head. The drawings are stiff and ill-proportioned, lacking artistry; the flaming crown of Apollo overwhelms his body. The later minatures are painted with more skill, the garment in particular are reproduced quite accurately. The constellation images begin with Aries, but instead of following the order of the original Greek poem, as MS Harley does, it completes the constellations of the Zodiac. The Sign of Scorpio is unusual as the Scorpion holds the Scales of Libra, it bears a human face and hands with four legs on each side. His raised and threatening tail is missing.

The Zodiac Signs are followed by a composite picture of the seven planets with the Sun encircled in the center and the others are aligned above and below in smaller circles. The circles of the planets are interlocked and labeled, but could be identified by their typical appearances, although the wings of Mercury could be growing out of his eyebrows. The illuminations then retreat to the standard beginning point with Draco, Ursa Major and Ursa Minor and continue through the cycle, depicting twenty-seven constellations in all. Folio 19v depicts a star group I

have never seen illustrated, the Hyades. This open cluster of stars is visible to the naked eye and found near the Pleiades, but is dimmer and blurry. Both star clusters are within the constellation of Taurus. The Hyades are depicted in the same manner as the Pleiades, seven individual female heads, but they are veiled, perhaps indicating that they are less bright. This presents a total of forty constellations, not complete, but more comprehensive than the twenty-four images found in Harley 647.[509] The constellation pictures that are missing in MS Harley 647 have been supplied from a Hyginus manuscript. At the end of the constellation images in Bodl.614, "the writer says explicitly that these images are not to be drawn indiscriminately, as they indicate certain positions of the stars in the sky and should therefore be carefully copied".[510]

The drawings of the constellations in Bodl.614 are mostly framed with colored ground, and all but a few of the constellation illustrations are similar to Digby 83, which are not framed. They differ greatly from the images in Tiberius C.1, as they are more fully drawn, and the text has been omitted from the bodies of the figures. The artist of Bodl.614 often combines three, four or more constellations crowded onto one page. The skillfully-executed drawings are of classical descent, but have taken on a new guise, heavily-clothed (perhaps reflecting English weather) and portrayed in a solid Romanesque manner. The draperies of the figures are drawn in fully-developed clinging curvilinear and V-folds, as seen in Cassiopeia (compared with Cassiopeia from Digby 83). The stars have interestingly been placed in the exact position. Even though Cassiopeia is framed, the base of her throne, feet and head extend beyond the borders. The iconographic motifs and designs retain their classical illusions, thus they are easily recognized,

[509] The constellations illuminated in Bodl. 614 are listed in Appendix B.
[510] Saxl, "Illuminated Science Manuscripts" in *Lectures* 108

but the newly-added attire is undisputably twefth century, typical of Romanesque illuminations. Orion in Bodl.614 has been brought down to Earth and placed in the doorway of an architectural setting, most uncharacteristic for one who dwells in the sky. His faithful dog, Canis, is not at his feet, and his garments completely hide the powerful physique of the mighty hunter. A few stars appear on his clothing, but his distinguishing three-star belt is not emphasized, partially covered with his sword.

The portrayal of mighty Hercules in Bodl. 614 is far from herculean, more dainty than godlike. He has lost his identifying attributes, the tawny lion-skin and his bow and arrows; he stands wielding only a rough club. Like Orion, his naked body is not on display, but fully covered; the short ruffled skirt of Hercules' garment is unbefitting the powerful hero of antiquity. The serpent that guards the Golden Apples has been substituted here for a small winged dragon. Hercules attacks the fanciful, contorted dragon with his club, scarcely different than a Romanesque St Michael. Romanesque book illumination, and Romanesque sculpture as well, are rich in distorted forms, interlacing and exaggerated postures. The bodies of the constellation figures in Bodl. 614 are of normal proportions, not elongated or convoluted; but the artist has covered the conventionally nude, or partially-nude, bodies of Orion, Hercules, Boötes, and Andromeda et al with weighty layers of concealing clothing. To avoid both giving pleasure to the eye and the imagination, and providing an occasion for temptation, the nakedness commonly seen in Aratean illuminations has been covered. Although the male heroes stand in threatening poses, they do not appear capable of mighty deeds. The constellation figures in this manuscript show close parallels with artistic conventions of the period rather than corresponding to other Aratean

illustrations. “This decomposition of the classical type was not the result of any increasing respect for the scientific and true position of the stars (which were still placed as arbitrarily as ever), but was due to a purely stylistic and intellectual evolution.”[511] Bodl. 614 and Tiberius C.1 are both modeled ultimately on Harley 647 and illustrate the same constellation cycle, but the creative spirit of each artist resulted in the production of two entirely dissimilar series of miniatures.

During the medieval period, artists restored, reinvented, and recopied images that had been preserved by Carolingian illuminators from antique sources. These conservative classical illustrations were continually recycled in *Aratea* manuscripts. The thirteenth and fourteenth centuries, with war, plagues, and famine, showed little interest in creating new versions of the *Aratea*, as only five survive. The situation changed dramatically in the fifteenth century since as many as twenty-six *Aratea* manuscripts survive. What factors motivated the remarkable surge in the number of *Aratea* manuscripts that appeared in the quattrocento, and who were the patrons commissioning, collecting and reading them?

4.6 TWO FIFTEENTH-CENTURY *ARATEA* MANUSCRIPTS

4.6.1 First Fifteenth-Century *Aratea* - MORGAN LIBRARY MS M. 389

The royal court at Naples was a hotbed of *Aratea* activity as four similar astronomical anthologies were made there in the fifteenth century for the king and/or chief administrators.

[511] Panofsky and Saxl 238

Morgan Library MS M.389 (hereafter M.389) is one of these royally-commissioned manuscripts; the other three are in the Biblioteca Apostolica Vaticana: Codex Vat. Barb.Lat.76; Codex Vat. Barb.Lat.77; and Codex Vat. Urbin. Lat.1358. All four have been honored holdings of the most prestigious libraries. Although they were produced at about the same time under the same royal patronage, the decor and appearance of M.389 and Vat. Barb.76 differ dramatically. These two manuscripts were selected for more detailed observation for several reasons. All four have the *Aratea* of Germanicus with the same general format, which alternates sections of verse with sections of prose scholia that are based on Hyginus and Germanicus. But although the text is similar, the illustrations show that the two artists drew from different exemplars; one is richly colored, the other neutral and subdued. The attire and iconography of the constellations display a variety of classicism and Oriental influences. Therefore they make a worthwhile pair for closer comparison.

State of the Literature

Literature: De Ricci, v.2, p.1439; Tammaro De Marinis, *La biblioteca napoletana dei re d'Aragona*, 1 Milan (1952) v,1 p.50; J. Martin, *Histoire du texte des Phénomènes d'Aratos*, Paris (1956); Tammaro De Marinis, *La biblioteca napoletana dei re d'Aragona*, Supplemento, Verona: (1969) 38; *Italian Manuscripts in the Pierpont Morgan Library*, NY (1953) no.8.; *Masterpieces of Medieval Painting*: *Pierpont Morgan Library*, University of Chicago Press (1980) 42; G. Toscano, "Matteo Felice: un miniatore al servizio del re d'Aragona di Napoli", *Bollettino d'Arte*, 93-94, (1995) 95

History of the Manuscript

M.389 was written and illuminated in Naples and dated 1469. The scribe, Joannes M. Velox signed and dated the colophon which appears on folio 117. The name of the artist is unknown, called the Master of Isabella di Chiaromonte, he was active 1455-1469. Noted on its colophon, M.389 was created for Antonella Petrucci (d.1487), who was secretary and prime minister to Ferdinand I, King of Naples. (He was later accused of treason to which he confessed under torture and he was executed.) By 1496 the codex was in the possession of Francesco Catalano of Messina, as noted on an inscription on the back flyleaf. The next owner was Andrea Matteo III, Duke of Acquaviva and Prince of Atri, who added his arms to the title-page over the original coat of arms. Ultimately it was purchased by J. Pierpont Morgan from a well-known bookseller, Léon Gruel, in 1910.

Text

This manuscript has 117 leaves with the text written in one column, and includes the *Aratea* of Germanicus with scholia along with fragments of the usual texts by Pliny and Hyginus. The opening page begins with the incipit, "*Aratus quidem fuit. Athinodori patris*". The frontispiece is written in large capital letters; the sections of the *Aratea* that are written in verse format have the first letter of each line enlarged and set a little apart. The letters are written in alternating pastel shades. The lines of Germanicus' verses are interspersed with sections of the scholia of Hyginus which provide the positions and numbers of stars.

Style, Placement and Iconography

The earliest manifestation of the Renaissance in book production is the humanistic book

which took on its typical appearance in Florence, under Cosimo the Elder.[512] In manuscripts considered to be humanist, the first identifying feature is an ornate title page bearing the imprint of the style of the particular workshop in the marginal decorations and in the elaborate initial letters. The initial folio, rarely any other page, displays an elaborate frame composed of white interlace and vines, imitating the decorated capital letters of the early Middle Ages and the Romanesque era, thought to belong to classical antiquity. Inserted between the white vines and interlace are placed coats-of-arms, winged putti, animals, and sometimes medallions. These features were all painted in delicate and subdued colors, and many of the fifteenth-century manuscripts include this typical opening format. Some grew extremely ornate with elaborate architectural structures and imagined author portraits, such as Book One of the *Natural History* of Pliny the Elder.[513]

The opening folio of M.389 follows the proscribed humanist format; it is surrounded with an ornate border of interlace and vines, with two putti holding a laurel wreath enclosing the arms of Andrea Matteo III in the bottom border. The 'A' of Aratus is decorated with pastel shades and twisted vines. The ornate frontispiece is followed by a celestial map and thirty-nine colored drawings of the constellations that appear at the top, bottom or middle of the page, usually before the description. The circular celestial sphere on folio 3v introduces the theme of the *Aratea* and displays the entire night sky with the constellations pictured in their relative positions. The celestial maps from M.389 and Barb.76 are quite comparable. The placement of the constellation figures is almost exactly the same; the Morgan image unfortunately has been published in reverse.

[512] Mario Salmi, *Italian Miniatures*, Harry Abrams, (1954) 48
[513] Venice, Biblioteca Nazionale Marciana, lat. VI 245, f.3 (1481)

(How can you tell which is reversed? The sword of Perseus is usually placed in his right hand and the head of Medusa in his left.) The celestial globes are divided into five concentric rings; the Signs of the Zodiac appear mostly in the fourth ring. Libra is missing in both, which is not unusual, as it was often conflated with Virgo or considered the 'Claws' of Scorpio.

Only a few details of the iconography vary between the two views of heaven. The most noticeable difference is the color tones. The Morgan artist chose a softer range of colors which are applied with a light-wash, while the illuminations done by the Vatican artist are painted in vivid reds, oranges and blues. The background of the M.389 map is not colored, just showing the hue of the parchment, compared to the intense royal blue sky setting off the figures of Barb.76. The celestial spheres hold a mixed blend of classical, but mostly updated iconography. The fact that all figures are facing forward, only Boötes is partially turned, reveals that it was not modeled on a classical exemplar. In the M.389 map, only three of the thirteen human figures are naked, four in the Vatican map. Most of the constellations retain their classical postures, but have been stripped of their clothing and iconographic features. They have shed the heavy clothing of the twelfth century and stand fixed in their identifying postures. The nudity of the pagan gods and enshrined heroes symbolizes their perfection, like Adam and Eve in Paradise, there is no need for manmade garments. A nude Hercules kneels but lacks his identifying club and lion skin; Perseus too appears naked, Medusa's head his only identifier. The Gemini twins have lost their stance as warriors, and are depicted as two naked children, not seen before the fifteenth century. Still Amphion holds the lyre in his right hand, a classical iconographic symbol which appears in MS Leiden *Aratea* and is commonly seen in Germanicus' versions.

Surprisingly the illustrations found in the quattrocento *Aratea* manuscripts are basically conservative and show no noticeable influence or traces of the late Gothic, nor of the great painters working in Italy at this time. The advances in painting techniques such as scientific perspective, harmonic proportions of human and animal figures, backgrounds of naturalistic settings, do not appear in the miniatures of the *Aratea* manuscripts. The illustrations mainly seem to be derived from a Carolingian prototype from Sicily.[514] Some constellation images, particularly the animals continued without change, but others like Eridanus, were replaced with new non-classical types, some innovations derived from the East, such as Cepheus, and some were freely invented, ie Baby Gemini. "Beginning in the second half of the quattrocento, imitation of the antique gradually reintroduced the classical types".[515] The depictions of the constellations in the celestial map are much less classical than the individual portrayals that follow.

The forty delicately-tinted constellations in M.389 are drawn in 'papyrus' style, and merely inserted between the sections of writing, with no backgrounds or framing device.[516] The images of M.389, like the frontispiece and the celestial map, are a softly-shaded tinted wash, and are nicely color-coordinated with the letters of the text. The figures of the sphere and the individual constellations do not always agree. The constellation image of Gemini depicts the twins as young men, rather than children mostly naked, but partially draped with long mantles. The cloak covers the left hand of Amphion that holding the lyre. The Twins do not retain the cap

[514] Harrsen 50
[515] Panofsky and Saxl 263
[516] The complete list of illustrations can be found in Appendix B.

and small cross on their heads, as in the Leiden *Aratea*, instead of crosses, small stars adorn their heads. Cancer is drawn to the right of their feet, looking more like a lobster than the Crab. Gemini are compared with those drawn in an earlier *Aratea* of Germanicus from the eleventh century, Dijon, BM MS 448. The illustration of Cepheus has taken on the appearance of a bearded Arab warrior, rather than the usual Eastern king, only the extended arms remind one of the antique depictions. The more classical version of Cepheus is found in the Leiden *Aratea*, the foreign king is attired in Persian garb, a short tunic trimmed in gold with loose leggings, and wears a Phyrigian cap. Two more constellations from M.389, Hercules and Ophiucus on Scorpio, are drawn with the reverse view. Hercules threatens the serpent guarding the golden apples with a green club; his iconographic lionskin appears in the shape of a shield. The colorful serpent encircling Ophiucus, or Serpentarius, is quite long, and they stare at each other in confrontation. The stars on the constellations are small red dots scattered mostly along the outlines of the figures. A few more astronomical images from M.389 will be discussed in comparison with those in Vat. Barb.76. The remaining constellation images can be viewed on line at the Morgan Library Corsair website.

4.6.2 Second Fifteenth-Century *Aratea* - BIBLIOTECA APOSTOLICA VATICANA CODEX VAT. BARB. LAT. 76

The Vatican astronomical compendium, Vat. Barb.76, (hereafter Barb.76) was also produced in the second half of the fifteenth century, another of the four similar astronomical codices, made for the royal court at Naples. Barb.76 consists of 100 folios with Germanicus' *Aratea* scholia written in prose format. Like M.389, it is illustrated with thirty-nine miniatures,

plus the celestial map. Vat. Barb. 77 consists of exactly the same contents, but for the most part, I have only seen inferior black-and-white microfilm images of both at the Vatican Film Library at St Louis University.

State of the Literature

Literature: G.Vire, 'La transmission du De astronomia d'Hygin jusqu'au XIII siecle': RHT 11 (1981) 173-276; M. Buonocore, *Vedere i Classici*, Fratelli Palombi Editori (1996) 486-88; E. Pellegrin, et al, *Manuscrits Classiques Latins de la Bibliothèque Vaticane*, Tome I, Centre National de la Recherche Scientifique (1975)123-25; de Marinis, *La biblioteca napoletana dei re d'Aragona*, 1 Milan (1952)158; J. Martin, *Histoire du texte des Phénomènes d'Aratos*, Paris, (1956) 39; T. Silverstein, *Medieval Latin Scientific Writings in the Barberini Collection*, Chicago (1957) 26; A. Dell'Era, Una miscellanea astronomica medioevale: gli Scholia Strozziana a Germanic: MAL 23 (1979) 152; A. Marucchi, *Stemmi di possessori di manoscritti conservati nella biblioteca Vaticana*, Vatican (1964) 31-32. This manuscript was on view at the 'Miniatures of the Renaissance' exhibit at the Apostolic Vatican Library, *Quinto centenario della Biblioteca Vatican. Minature del Rinascimento. Catalogo della mostra,* Città del Vaticano (1950) and described briefly in the exhibition catalog on page 25.

History of the Manuscript

Barb.76 was created for Ferdinand I d'Aragon, king of Naples (d.1491), or a member of his court. This manuscript and another from the group of four *Aratea*, Barb.77, were acquired by Cardinal Maffeo Barberini, later Pope Urban XIII. In 1901 the magnificent Barberini library rich in manuscripts, incunabula and rare editions was acquired for the Vatican Library by Pope Leo

XIII, this collection is now a core section. Following the lead of Nicholas V, Leo XIII enriched the Vatican's collection and also reformed and adapted the library to better meet the needs of the times, including conservation and access to scholars. The illuminations in Barb.76 are in part the work of Matteo Felice, who painted for the king of Naples.

Text

The text of this manuscript depends on a lost prototype with Germanicus text, a branch of the O family.[517] The format of the text layout follows the pattern often seen in fifteenth-century *Aratea* manuscripts. Beginning on folios 1 and 2 with the title, *Genus Arati*, is the standard 'Life of Aratus'. The incipit is '*Aratus quidem fuit Athinodori patris filius ..*'. Folios 2v-66 mostly contain *Scholia Strozziana* and extracts of Germanicus' *Aratea*. The incipit for this section is '*Coelum circulis quinque distinguitur...*'. The text of Germanicus' poem begins on folio 6 with *Ab Iove principium magno deduxit Aratus carminis.* Like the M.389, the text of the poem, written in verse format, has the larger first initial of each line as a capital letter and slightly larger. Folios 68v - 71 are also Germanicus extracts, and folios 71v - 77 are more of *Scholia Strozziana.* The incipit for this section is '*solem per se ipsum constat moueri...*'. The text is written with dark ink in one column only, in a neat humanistic script. Opening initials of each prose section are enlarged and illuminated in gold and various bright colors. This astronomical compendium also contains some passages of the *Natural History* of Pliny, folios 77v - 86 and extracts from *De astronomia* of Hyginus on folios 86 - 100. The poem is divided into sections and alternates with the scholia, the illustrations appear before the descriptions.

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[517] Gain 2

Style, Placement and Iconography

Like the other fifteenth-century codex, this book opens with a humanistic frontispiece with Neapolitan decoration showing influences of the schools of Northern Italy; ornate scroll work, white interlaced branches, with putti around the border, and animals figures. Inserted in the decorated border is a bust of a woman in a medallion on the left, and the bust of a man in another on right. It also has a large decorated 'A' for Aratus. The arms of Ferdinand of Aragon surmounted by a crown are painted in the bottom border and the arms of Cardinal Barberini were added later.

The first miniature of the *Aratea*, folio 3, is the five-ringed celestial map which is followed by descriptions of the constellations, including the positions of the stars and the total number.[518] Text on the heavenly circles and earthly zones, torrid, temperate and fridgid appears next. The drawing of Jupiter sitting on a large eagle, holding a flaming torch and a scepter, appears on folio 6 and the first six lines of Germanicus' poem are written below. The last section of the anthology, after the full constellation cycle, is comprised of the work of Pliny and Hyginus, *De astronomia*, and they are accompanied by only three miniatures. A miniature of Helios in his chariot appears on folio 73v and Luna in her cart with two bulls on folio 77 with excerpts from Pliny's *Natural History* between the two luminaries. More often, the Sun and Moon are painted on the same or adjoining pages, not separated by text. The third miniature in this section is Centaurus holding a branch in each hand. The three illustrations seem to be painted by the same artist as the constellation series.

[518] The complete list of constellation illustrations can be found in Appendix B.

The individual constellation images in Barb.76 are presented in a different manner from M. 389, set apart from the text by a brown, square or rectangular border in the design of the Leiden *Aratea*. The painting technique is different as well; while M.389 has simplified figures drawn with soft pastels, Barb.76 is painted with a richly-colored palette in a more dramatic manner. The images in M.389 have no background and appear quite plain, but the Barb.76 artist has added interest with more details. The space within the border of the Barb.76 constellations is completed filled with a mottled white shading that invokes cloud cover, which then dissolves into a deep blue of the sky.

When comparing four images from the two contemporary manuscripts, the first miniature is Helios from M.389 which is quite similar in design to the Luna in Barb.76, except for its four horses which are much larger. The colors and treatments of the two luminaries vary in their intensity of hues; the M.389 Sun, wrapped in a pale red mantle, is delicately shaded, while the framed Luna is more strongly painted in bright colors. Luna in Barb.76, with hair and cloak flying in the wind, holds a lighted torch aloft. Compare too the verse format and delicately written script of M. 389 with the prose format and bolder script treatment of Barb.76, both compliment the image. The two depictions of Aquarius vary greatly also. The illustration of Aquarius from M.389 wears a short tunic with head covered as he pours water from the urn; the Aquarius in Barb. 76 stands in the same pose with head turned, but he is dark-skinned and has adopted Arabic attire, short tunic, with his head-covering wrapped around his neck. The water pouring from the urn is indicated by a double string of stars. Some influences from medieval Islamic illustrations can be detected, but since the Arab astronomical traditions were derived from Greek and Roman

sources, the differences are superficial. The Sign of Capricorn appears in the same frame with Aquarius; his ornamented tail looks back to details acquired in the Romanesque period. The individual stars in the Barb.76 constellations are bright red, much larger and more plentiful than those in M.389. In both manuscripts, stars are pictured on all the constellations, but all are inaccurate and randomly placed.

The third manuscript produced for the court at Naples, Barb. 77, is quite similar to Barb. 76, but its constellation miniatures are not enclosed within frames. The constellations images are skillfully drawn with some modeling, but little color, only a soft brown-orange, has been added. The last courtly manuscript from the Naples group, Vat.Lat.1358, is also decorated with the complete constellation cycle. The minatures are reminiscent of Barb.77, but the shades of brown and orange are much bolder. This Vatican codex also begins with the full celestial sphere. The format of the four *Aratea* of Germanicus produced in Naples are typical of the fifteenth-century manuscripts that I have managed to see view. Appendix B supplies more details concerning the other manuscripts.

4.7 SUMMARY

The three historical periods investigated here are each considered renaissances, stimulated by different forces and driven by different incentives. For the purposes of this dissertation, it was necessary to take a specific viewpoint, focusing mainly on the production of ‘scientific’ manuscripts, on the revival of astronomical knowledge, and how both interacted with society.

During the ninth century, the classical poem of Aratus through its Latin incarnations was revived by the Carolingians in a variety of formats that were for the most part inspired by Late Antique prototypes. The two earliest examples of this inquiry are emblematic of the effort and expertise expended in creating codices during the Carolingian period. The illustrated *Aratea* manuscripts must have been enjoyed and treasured, as thirteen examples are still extant more than a thousand years later.

During the twelfth century, a full corpus of ancient Greek and Hellenistic astronomical knowledge, especially the *Almagest* of Ptolemy, was restored through the collaboration and erudition of Christians, Jews and Arabic scholars. The modest number of *Aratea* manuscripts from that time demonstrates that astronomical knowledge was available from numerous new sources. The astronomical theories of Ptolemy, Plato, Aristotle, Abu Ma'shur, and al-Sˆf′ were copied in large quantities, while fresh versions of the *Aratea* slowed. It is possible that many libraries already held a copy, since numerous manuscripts were produced in the previous centuries. The *Aratea* tradition survived longer, and seems to have been stronger, in England than on the continent at that time. The two twelfth-century examples demonstrate that those responsible for creating new Aratean manuscripts had a desire to enlarge Cicero's version to include a more complete cycle of constellations. If the surviving numbers are representative of reality, the thirteenth and fourteenth centuries too saw a dwindling interest in the *Aratea* tradition. Although the more sophisticated mathematical astronomy and predictive astrological techniques took a more prominent place in manuscript production, the popular astronomy found in the *Aratea* manuscripts did not disappear, but was still written, illustrated and read.

During the fifteenth century, another renewal of astronomical scholarship developed, in its wake followed the reappearance and renewed appreciation for the gods of antiquity. Joscelyn Godwin, writing about the pagan revival, sums up the situation:

> The pagan divinities are a hardy breed. After being subverted by Homer, atomized by Lucretius, and toppled from their pedestals by the Christians, one would have thought them finished.[519]

Actually the reverse occured, recreations of the pagan deities decorated the villas and palaces of the wealthy nobles and cardinals. Ancient myths and exploits of the gods became popular themes on the walls and ceilings, on tapestries, and for statuary in gardens and fountains. The writings of distinguished historians and iconographers such as Abby Warburg, Erwin Panofsky, E.H. Gombrich, and Jean Seznec have examined and theorized on the reappearance of the pagan cosmos in the European imagination.[520] Their systematic studies of symbolism brought to light the connections between the Neoplatonic theories and underlying esoteric messages in fifteenth and sixteenth century artwork. Constellation images filled the pages of the astronomical anthologies in medieval libraries and cosmological images filled the ceilings of fifteenth-century salons. After two centuries of relative neglect, the volume of astronomical symbolism lying dormant was brought to light. The Sun, Moon and stars of the *Aratea* had not been eclipsed by events and disinterest in the late Middle Ages. The fifteenth century witnessed an explosion of illustrated *Aratea* manuscripts, not updated, recycled or improved, but still looking back with nostalgia to its antique roots. Newly-invented iconography did adorn the constellations and planets in astrologically-based manuscripts, derived particularly from Abu

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[519] Godwin, *The Pagan Dream of the Renaissance*, Phanes Press, 2002 p.1

[520] See Warburg, *The Renewal of Pagan Antiquity*; Gombrich, *Symbolic Images: Studies in the Art of the* Renaissance.

Ma'shur and Michael Scot. These are varied and plentiful, and would require another complete study. But in *Aratea* manuscripts, the same basic designs and formats from earlier medieval books continued to be copied with a few new influences, and some independent inventiveness of the artists, but without major overhaul or innovation. Why? Obviously there was value in protecting this particular body of information, text and image in its classical form, and transmitting it basically intact into the printed era.

By the fifteenth century, the illuminations on the pages of religious manuscripts had been transformed by artists who had mastered the depiction of light, illusion, texture and space; but the illustrations in *Aratea* manuscripts maintained the same antique format. Secular books of highest quality and sophistication appeared in connection with new developments in careful observation of nature. Decorated borders grew in richness and variety; but these innovations had a minimum impact on the illuminations of the *Aratea* manuscripts. The two fifteenth-century examples demonstrate how the *Aratea* retained their medieval incarnations, acquiring some Eastern influences, but continually looking back to the classical past. The *Aratea* were no longer enjoyed, if they ever were, for their poetic verses or 'scientific' material, but for their myths, pictures and historical appeal. The long pictorial tradition of Aratean manuscripts was instrumental in sustaining the antique mythological images that were treasured in the Classical, medieval and Renaissance periods.

Toward the end of the fifteenth century, the age of the fabulous illuminated manuscripts was coming to a close, as the printing press was revolutionizing book production. The handwritten, painted parchment was replaced with paper and woodcuts, although deluxe books in

large and expensive folio format were still produced for wealthy booklovers. From the start of printing, the *Phaenomena* of Aratus and the *Aratea* of Germanicus, Cicero and Avienus were among the first classical poems selected to be published; the watered-down text was edited and restored as much as possible. The printed editions were decorated, not as expected with newly-designed Renaissance-inspired images, but with the familiar figures passed down from Antiquity. The constellation illuminations from the Leiden *Aratea* and Hyginus manuscripts in particular were accurately copied for the printed editions. The fact that the Latin *Aratea* of Germanicus, Cicero and Avienus continued to be read, studied and analyzed for two millennia is testimony to their valued position as a vital part of our classical heritage.

The fourth chapter looked at some of the cultural and historical factors that influenced the production (or lack of production) of *Aratea* manuscripts. It also examined in more detail six representative manuscripts situated within their historical context. The illustrations of these particular manuscripts were discussed in more detail to compare the artistry of different centuries.

5.0 ANALYSIS AND CONCLUSIONS

This dissertation has gathered together sixty surviving Aratean manuscripts, most of them illustrated, and has provided basic factual information on the majority of these manuscripts. Where time and availability allowed, a more in-depth presentation on important details and particular characteristics of the manuscripts was also included. This inquiry looked not only at the manuscripts themselves, but at many of the societies and cultural climates that produced them. These various factors and influences cannot be separated or excluded when endeavoring to gain a more substantial understanding of the function of this complex tradition. This examination is far from complete, merely an initial step toward bringing organization and clarification to this sizable and extremely long-lasting artistic tradition. Much still remains to be accomplished. Each of the sixty extant manuscripts could be inspected and placed in proper perspective. Other areas such as Eastern Europe have not been thoroughly scrutinized for possible survivals of *Aratea* or other illustrated astronomical manuscripts.

This topic of necessity encompasses four inter-related disciplines: history of literature, history of myth, history of science, and history of art. *Aratea* manuscripts are by their nature a meeting place of these distinct branches, all enveloped in one vast and complex topic. What is most essential about this phenomenon is that the poem of Aratus in its successive incarnations

has survived through centuries of modification and transition, which speaks to its importance in all these disciplines. This study has tried to limit the scope of this immense topic by concentrating mainly on one specific aspect of the body of *Aratea* manuscripts, its role in the transmission of astronomical information, and to three specific time periods, as more would be overwhelming. But the long and complicated transmission of astronomical knowledge from the Greco-Roman World to the Latin West cannot be oversimplified or limited to just a few time periods or to a single manuscript tradition. Therefore I included, for context and comparison, a brief discussion of the main channels for transmitting astronomical learning. Looking at the other sources of astronomical knowledge circulating during the Middle Ages can assist in determining what part the information found in *Aratea* manuscripts actually played in the history of astronomy. In that way, the position of *Aratea* manuscripts can be evaluated in content and importance by comparison, together with other channels of astronomical information.

When undertaking the study of *Aratea* manuscripts with a holistic view, numerous factors were considered. The culling of information from the historical literature and from the manuscripts themselves focused on the wider view, as a more narrow approach could not provide a proper perspective or understanding. Each surviving *Aratea* manuscript belongs to its own particular circumstance of production, created by the social, cultural, political and educational events that instigated its manufacture. Even though each stands alone, noticeable patterns can be detected and certain conclusions can be drawn from this examination. Basing my discussion on art historical and historiographic methods, I have sought to establish the function of the *Aratea* in various disciplines. Much of the material included in this study has never been assembled in one

place, or presented in a systematic and comprehensive form. This interdisciplinary inquiry has drawn together the separate aspects of *Aratea* manuscripts and looked at the different roles they played in order to gain a fuller understanding of their place in the history of astronomy and art.

5.1 SUMMARY OF FUNCTIONS OF *ARATEA* MANUSCRIPTS

Function of *Aratea* in History of Literature

This semi-religious guide to the constellations written by Aratus in the third century BCE has lived a lengthy and intriguing life. What factors allowed this astronomical poem to survive and thrive until the present day when so many ancient works perished? Although little read today, didactic poetry was enormously popular in the ancient Greco-Roman world. "Obviously, the purpose of didactic poetry is to instruct the reader, usually in a systematic manner, with a single instructor's voice advising or explaining to those he is addressing."[1] Through the easily-remembered verses of his poem, Aratus taught his readers the relative positions of the constellations along with the order of their risings and settings. The instructive quality of his original Greek poem was maintained in the initial Latin translations, but the astronomical content cannot be separated from the poetic skill and literary value of the Latin authors. All of these features: the subject matter, the artistry, and the sense of history, were appreciated by learned readers in the Classical world. During the Middle Ages, famous authors from the Classical world

[1] Toohey, Peter, *Epic Lessons*, London: Routledge, 1996 p 2

were highly respected for their literary excellence. Thus much of their writings has been conserved and treasured. Fortunately the Greek poem of Aratus and the Latin poems of Germanicus and Avienus survive, along with fragments of Cicero, as "an enormous amount of Latin literature was lost even in ancient times".[2]

Interest in classical literature in the ninth century, was an important factor, influencing the large number of *Aratea* created, and this interest continued into the later centuries. During the twelfth century, many developments took place in the field of literature. A great quantity of new Latin poetry was composed to accompany sacred music with religious verses, uniting music and literature. Interest in literature broadened as Latin authors rewrote earlier classical epics, such as the *Iliad* and the *Aeneid*, updating them and adding recognizable medieval traits to their characters.[3] The adventures of popular heroes of history, Alexander the Great, Charlemagne and King Arthur, were recounted in both Latin and the vernacular. The love poetry of Ovid was revived by medieval readers and courtly love literature entertained audiences in the high Middle Ages. Even though only four *Aratea* manuscripts survive from the twelfth century, many earlier manuscripts would have been available, and perhaps many may not have survived.

But the pure poetic content and literary excellence of the original Latin compositions changed and declined through the long centuries of the Middle Ages. Already in the Late Antique period, the poems of Cicero and Germanicus had been 'corrupted' and corrected with the addition of scholia. The Aratean poems preserved by Carolingian scribes are the versions

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[2] Reynolds, *Text and Transmission*, xiv
[3] Colish 182

truest to the original Roman authors. The renderings of the Latin *Aratea* that are carried through the Middle Ages are far from the pure epic poetry of Aratus. What passed as the poetry of Cicero and Germanicus was more a hodge-podge of assembled astronomical writings interspersed with scant sections of poetry. Usually not more than six or seven lines of verse appear together on any manuscript folio without being interrupted by segments of prose and illustrations. The Latin poem of Avienus was without scholia, less impaired, and survives in a more intact state, but his manuscripts were not illustrated. Therefore his version of the *Aratea* was less popular. Since only three manuscripts containing the poem of Avienus survive, his work is not an essential part of the illustrated Aratean tradition and will not be included in most discussions. This raises the question, did the fact that the *Aratea* of Avienus had no illustrations keep the poetic content intact? Did the addition of pictures somehow detract from the poetic value and the literary content of the *Aratea* of Germanicus and Cicero, or were separate factors influencing the deterioration of the poem?

From the tenth to the fifteenth centuries, the Latin poems of Cicero and Germanicus became more and more diluted. The *Aratus Latinus* and the *revised Aratus Latinus* had eliminated the verse format completely and were written entirely in prose. The brilliance, wit and erudition of the classical poetry were no longer core features of Aratean manuscripts. The literary value had been simplified and the clever allusions to literature of the past had been lost. The unity and beauty of the original astronomical vision, a starry sky designed by a benevolent force first envisioned by Aratus, and then transmitted by the Latin translators, had degenerated. Although the literary excellence of the original works was not often conveyed intact, the general

textual content was retained in a reduced state. The body of astronomical information, the descriptions, myths and images continued to be transmitted, but the literary value of epic poetry survived in a less than pure state. The epic poetry of Aratus and the Latin authors are still studied today and mined for their depth of material. The mythical component of the *Aratea* manuscripts as well plays a significant role in their value both in the medieval period and today.

Function of *Aratea* in History of Myth

What was the significance or relevance of preserving the knowledge of ancient Greek and Roman mythology in the Middle Ages? In a culture dominated by Christianity and the Christian Bible, why were the tragic, heroic and lusty myths of pagan gods and goddesses still of interest? In medieval societies where few were able to read or had access to books, how did people acquire their knowledge of ancient mythology? In the Roman world, interest in the past and in Greek art and culture was understandable. "A comprehensive knowledge of Greek myth was essential for anyone who wanted to hold his head up in polite society, throughout the Roman world. Not just for reading the classics or identifying allusions in contemporary poets and orators but for understanding the conversation of peers, scenes on wall paintings, silver plate, mosaic floors and the decoration of the sarcophagi in which loved ones were now interred".[4] Religion, myth and art were closely allied in classical culture in an attempt to give expression to the forces of nature that dominated daily existence. Educated persons in the Roman world knew Classical myths in the same manner that medieval Christians knew the stories of the Old and New Testaments. Even though Christianity supplanted paganism as the religion of the Roman and

[4] Cameron 222

Late-Antique world, learned people continued to enjoy the stories of classical mythology along with those of the Bible.[5] It was impossible to dismiss thousands of years of history and folklore.

In the Middle Ages, the ancient myths were acted out and alluded to in performing arts; mime, plays, songs and musicals.[6] In addition, the fabled places of myth were still remembered and revered as medieval pilgrims traveled to famous sites in the Mediterranean world. The feats and archetypal traits of the planetary gods and constellation figures had become deeply rooted in human consciousness. "The myths preserve and transmit the paradigms, the exemplary models, for all the responsible activities in which men (and women) engage."[7] The symbolic tales of myth often contained lessons for understanding human nature and timeless truths, in the same way that stories of the Bible are now considered symbolic, created to project those eternal truths in a fundamental manner.

"The pagan divinities served as vehicles for ideas so profound and so tenacious that it would have been impossible for them to perish".[8] Undoubtedly the illustrated *Aratea* manuscripts were a dominant factor during the medieval period, credited with helping to keep alive the Classical tradition with their pictorial images of the planetary gods and goddesses, as well as the numerous characters from the ancient myths. The mythological material was not entirely adapted from the original poem of Aratus for he included very little about the mythology of the constellations. The myths are limited in number, as Aratus gives only fourteen brief myths

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[5] For more information of this survival of ancient mythology see Jean Selznec and also Weitzmann, "Greek Mythology in Byzantine Art" and *Studies in Classical and Byzantine Manuscript Illumination.*

[6] Cameron 228

[7] Eliade x

[8] Seznec 149

for the forty-three constellations he discusses. In his translation, Germanicus doubles the number of myths, but much of the mythological material present in astronomical manuscripts can be traced to Hyginus whose work, as we have seen, was added to *Aratea* manuscripts as scholia. The works of the two different traditions became intermingled in the Middle Ages, probably indistinquishable to a medieval reader.

In the Christian era, the colorfully-painted *Aratea* manuscripts were an acceptable means of transmitting mythological stories, as they combined the lure of science, history and ancient knowledge. Although the Aratean codices generally did not expand the mythic stories beyond the basic 'facts', the tragic story of Cepheus and Cassiopeia, the sacrifice of Andromeda, the feats of Perseus and Orion, and fate of Virgo could spur the reader's remembrance of these ancient archetypal tales. The heroic expedition of Hercules in his search for the Golden Apples and the danger-ridden voyages of the Argo in Jason's quest for the Golden Fleece epitomize the "difficulties of the seeker for the road to the self, to the 'center' of his being".[9] "The road is arduous, fraught with perils, because it is, in fact, a rite of the passage from the profane to the sacred, from the ephemeral and illusory to reality and eternity, from death to life, from man to the divinity."[10]

The text of *Aratea* manuscripts fulfilled a vital function in maintaining the continuity of the entire corpus of astronomical myths from antiquity to the present day. Not only did the body of mythical material transmit the age-old stories, but the astronomical images captured and

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[9] Eliade 18
[10] Eliade 18

retained the visual impact in a way not possible in any other media. This is not the case for so much of ancient Greek mythology. "The images that survive from antiquity represent only a fragment of what once existed, the same is true of the myths they illustrate. Out of the hundreds of tragedies dramatising myths that were produced in the 5th century BC, we have only thirty-one, the rest having been lost when neglected books ceased to be copied, old manuscripts disintegrated and precious libraries were destroyed."[11] The role of the illustrated *Aratea* manuscripts in the transmission of ancient myths therefore is enormous; not so much for the individual tales, as they are basically brief and limited in their details. Its chief accomplishment is in relaying intact throughout the entire Middle Ages the complete corpus of astronomical mythology associated with the classical constellations from ancient Greece and Rome. The *Aratea* manuscripts conveyed the full body of mythological material related to the constellations, and also retained the depictions of characters from classical antiquity who were featured in the myths. Modern culture is much richer for having access to this corpus of astronomical textual material along with its illuminating images.

Function of *Aratea* in History of Religion

Since the poem of Aratus, and the translations of Germanicus and Cicero as well, were all written before the advent of Christianity, they have no association or references to the tenets of the Christian religion. In the area of religion, the points of interest for this study are how this 'pagan' poem about the celestial deities from antiquity was received and accepted in the medieval Christian world. The Church, particularly the monasteries, was chiefly responsible for

[11] Woodford 255 *Images of Myths in Classical Antiquity*, Cambridge University Press (2003)

the preservation of classical learning[12], and also for the survival of *Aratea* manuscripts. The majority of the manuscripts that survive from the early medieval period are biblical and liturgical books, especially from the Latin Church Fathers: Augustine, Jerome and Gregory. As manuscript production increased in the ninth century, the main focus and effort was directed toward religion and exegesis. "While the Christian Fathers endeavored to prove that the pagan gods were either illusions or malignant demons (therefore transmitting much valuable information about them), the pagan world itself had become so estranged from its divinities that the educated public had to read up on them in encyclopedias, in didactic poems or novels, in special treatises on mythology, and in commentaries on the classic poets."[13] Although the attitude of the Christian Church to pagan learning may have been complex and ambivalent, the aura of respect for Greco-Roman intellectual accomplishments permitted the retention of ancient literature such as the *Aratea*.

The success of Christianity and the degree to which it gradually engulfed more and more of the intellectual drive and emotional commitment of the Latin West could only have been at the expense of pagan literature and values. In order for the Aratean manuscripts to survive through the thousand-year medieval period, it was necessary for them to find refuge within the walls of monasteries and cathedrals. The astronomical manuscript tradition was carried forward and new Latin 'editions' of Germanicus and Cicero were produced every century. Pagan poetry and myths about the ancient gods, goddesses, heroes and heroic animals who became catastrophized continued to be enjoyed along with Christian teaching. "Among the great men of the Middle

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[12] McCluskey x
[13] Panofsky (1955) 45

Ages, we find that a radical rejection of everything that was not Christian could co-exist alongside a humanist education, if both were indissolubly linked together. On the other hand, knowledge of the classical authors was a necessary prerequisite of Christian culture."[14]

Therefore the reception of *Aratea* manuscripts in Christian Europe during the medieval period was one of honor and respect. The fact that *Aratea* manuscripts were continually copied and revitalized, often in monastic settings, is evidence that the classical heritage was valued inspite of, or perhaps because of, their subject matter. It is a credit to the poetry of Aratus, Cicero and Germanicus that the pagan aspects of their poems were in most cases not edited nor removed, but respected and maintained. Unlike other classical writings and encyclopedias, the *Aratea*, although 'watered down' with scholia, were not 'improved', moralized or Christianized. Even though all manuscripts were produced under the domination of Christianity, Christian dogma does not enter the Aratean tradition.

Another 'Aratean' issue that needs to be addressed is how the astronomical information in *Aratea* manuscripts came to be perceived by modern historians as relevant to the Christian calendar, feast days and computus. The function of *Aratea* manuscripts in the history of religion is often misunderstood and its astronomical content has been misinterpreted. Large amounts of misinformation can be found in the art historical literature concerning this tradition. Even well-respected scholars are unclear on the content and meaning of the poem, but in their defense, there has been no comprehensive source to provide this basic information. In the *Illuminated Manuscript*, Janet Backhouse, in her description of Cicero's *Aratea*, BL Harley MS 647, states,

[14] Bischoff (1994) 156-59 See Bischoff for further considerations on the Christian attitude toward Classical authors in the Middle Ages.

"This became the fundamental textbook of medieval astronomy, a science of everyday importance, because correct observance of the Church's feast-days depended upon an accurate understanding of the movements of the heavenly bodies."[15] This is a complete misunderstanding, both of the *Aratea* tradition and of the method of determining moveable feast days. It is true that determing the date of Easter was a recurring problem during the Middle Ages. But the information found in *Aratea* manuscripts, as mentioned, concerns the positions of the constellations and the order in which they rise and set. This data was helpful for orienting your position on Earth at night, or determining the time of night, but was of no use for establishing the date of Easter or other Church feast days. The date of Easter was determined by a complex mathematical formula based on the 18 ½ year cycle of the moon, not by direct observations of the night sky. Complicated computus diagrams were required in order to determine the date for Easter, and these are sometimes found in the same manuscripts as the *Aratea*. This may account for the confusion. The *Aratea* material does not discuss the cycles of the Sun, Moon or planets, and especially not Christian calendars.

In another example, Deborah Kahn in *Canterbury Cathedral and Its Romanesque Sculpture*, looking for prototypes for sculpture in manuscripts, states, "This sea-monster (Cetus) can be found in its proper astronomical context in the *Phaenomena* by Aratus, the fundamental text for the calculation of the liturgical year. ...Its presence in the library may explain the popularity of this type of grotesque in Canterbury manuscripts and sculpture".[16] The manuscript

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[15] Backhouse (1986) 14

[16] Kahn, D. Canterbury Cathedral and Its Romanesque Sculpture, London: Harvey Miller, (1991) 60

to which she refers is not the *Phaenomena* by Aratus, but the *Aratea* of Cicero, and the calculation of the church's liturgical year was never a consideration of the *Aratea* manuscripts.

As the strongly religious environment of the Middle Ages gave way to the more relaxed attitudes of the fifteenth century, the astronomical illuminations in *Aratea* manuscripts continued to be reproduced, but in larger numbers. The wealth of classical symbolism that they contained and transmitted grew. The *Aratea* manuscripts were no longer lanquishing in monastic libraries, but were produced anew and collected by cardinals and nobility for their private libraries. But still the naked images of the pagan gods and heroes created no conflict for Christian leaders. At the start of the fifteenth century, almost no images of the classical gods had been represented in frescoes or sculptural form for a thousand years, although they were available in astronomical manuscripts. By the end of the quattrocento, the images of the classical deities, latent in *Aratea* manuscripts, began to decorate the walls, ceilings, and gardens of numerous palatial homes. "A significant change in the reception and status of the pagan gods and a fundamental transformation in the history of art is what happened to idols in the fifteenth and sixteenth centuries."[17] Along with the decor of the classical deities and demi-gods, Renaissance palaces and estates displayed the religious art and symbolism of Christianity. The intermixing of old and new religions seemed to create no struggle for the conflicting images. The *Aratea* manuscript tradition, having no direct connection with Christianity, passed through the Middle Ages 'watered down', but unscathed by religious fervor.

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[17] Camille 338

Function of *Aratea* in History of Astronomy

Today astronomy has become a topic of little concern or relevance for the majority of people, except during the rare appearance of a comet or the occasion of a solar or lunar eclipse. Astronomy exists strictly in a rarified atmosphere, the domain of astrophysicists, celestial mechanics, and theoretical mathematicians. But this was not the case in the world before electronics. The night sky and the movements of the celestial bodies were an intimate part of the rhythms of everyday life. In attempting to assess the function, influence and role of the *Aratea* manuscripts within the discipline of astronomy, it was necessary to examine the various aspects separately in order to gain a better understanding of that role. Thus this inquiry looked at other astronomical writings and at other manuscript traditions.

The Latin West had inherited only meager extracts of Greek science; it was careless in observation and reckoning. For the most part, Western Europe made a painfully slow start in scientific advances. Through his studies of the history of medieval astronomy, Stephen McClusky has created a helpful model for defining astronomical knowledge in the early Middle Ages. He has determined that there were at least four distinct astronomical traditions that 'flourished and interacted'.[18] The first and oldest type was a traditional folk astronomy, the main feature of which was an observational solar calendar, dividing the year into quarters on the dates determined by the solstices and the equinoxes. This type includes the use of the heliacal rising and setting of prominent stars or constellations to note significant points in the solar year. This technique is found in the earliest literature of the Greeks, and undoubtedly goes back to ancient

[18] McCluskey (1993) x-xi

times. Evidence for this tradition extends from prehistoric stone monuments to medieval Christian festivals, for many saints' feast days are celebrated on particular celestial markers. As we well know, the four key dates of the astronomical year were taken over for celebrating the conceptions and births of Christ (March 25, December 25) and St John the Baptist (June 24 and September 24).

The second medieval astronomical tradition was computus, the arithmetical astronomy used to calculate the date of Easter. This discipline required continual calculations and updating to be sure all areas of the world celebrated Easter on the same day. A third kind of astronomy was centered around the observations of the stars to determine the time of night, a necessary procedure in many medieval monasteries for ritual prayer.[19] The fourth tradition involves geometrical astronomy, concerning the continuous motions of the heavens within a geometrical model of the universe.

The *Aratea* manuscripts are not a direct component for supplying needed data to any of these four astronomical classifications. When considering the first type, *Aratea* manuscripts do not provide specific data for determining the calendar, merely general locations of the constellations as they relate to each other, and their risings and settings. As for the computus and calculating the date of Easter, obviously *Aratea* manuscripts have no association with this Christian aspect of astronomy. The material in Aratean manuscripts may have been helpful in the third type, determining the time of night by the position of the stars. But this requires years of careful observation of the heavens since the area of the sky visible each night changes through

[19] See McCluskey, "Gregory of Tours, Monastic Timekeeping and Early Christian Attitudes Toward Astronomy", *Isis*, LXXXI: (1990) 9-22

the year and that sort of specific information is not included in the *Aratea*. The fourth astronomical tradition is definitely not a factor for the type of information in Aratean manuscripts. Nor do they contain any information gained from the technical astronomy of other ancient Greek writers. In what way therefore does the information found in *Aratea* manuscripts become significant in the history of astronomy?

Astronomical Content of *Aratea* Manuscripts

In the course of my research, I asked many direct questions. In particular, what kind of astronomical information can be derived from the poem, and how was that data received, used and modified through the Middle Ages? Unfortunately the complicated and extensive tradition of *Aratea* manuscripts does not allow a simple answer, as the content of the original poem of Aratus differs enormously from what passed through the medieval period. The three Latin translators generally follow the lead of Aratus in the data they include in their versions. To determine the exact information included in each Latin version would be an enormous undertaking, especially since the manuscripts are not uniform. For a general understanding of the direct astronomical information in the original Greek *Phaenomena* of Aratus, the following will suffice:

> 1. The *Phaenomena* states the names and positions of forty-six constellations, starting at the north celestial pole, and then tells how the constellations relate to each other in space.
> 2. The later section of the poem is more technical, relating the design of the heavens with the polar axis, and four celestial circles, defining the Tropics of Cancer and Capricorn, the ecliptic and the Milky Way. (463- 545) Kidd
> 3. The poem differentiates the constellations in the northern from the southern celestial hemispheres.
> 4. It names the Signs of the Zodiac, beginning with the Crab through the Twins, and explains that the sun ‘goes round this circle’. (546-555) Kidd

What the original Greek poem and Germanicus' version do not touch upon is important as well.

1. The particular stars that make up the constellations are not a concern; for the most part, they are not mentioned individually, since few stars were even named at that time.
2. The poem does not include the number or position of the stars within each constellation, although this is added through the scholia.
3. There is only minimal mention of the planets, with no specific information about their order, or their movements, not even their names or traditional attributes. This is true for the Greek and the Latin versions.
4. There is no information on transitory events, such as comets, solar or lunar eclipses, or hours of daylight. Interest focuses on the perfection of the celestial realm.

In addition to the direct information that can be found in the *Phaenomena*, a variety of indirect data can be deduced through calculations and computer reckoning.

Indirect Information Determined by Modern Astronomers

A surprising discovery was brought to light by astronomer Sergey Zhitomirsky in his investigation of the roots of the original celestial observations used by Aratus when composing the *Phaenomena*.[20] His recent studies have extracted additional and most unexpected data from the poem. By scientific analysis of the text of the poem, astronomers have determined exactly how Aratus derived his view of the constellations. You would expect that Aratus would have just looked up at the night sky and described what he saw, but that is not so easy. You can never get a complete view at one time, since the positions of the constellations turn through the hours of the night and the course of the year. Even astrologers did not create natal charts directly from their

[20] Zhitomirsky, "Aratus' *Phainomena*: Dating and Analysing its Primary Sources", in *Astronomical and Astrophysical Transactions* 17: (1999) 483-500

own observations of the heavens; they always looked up the exact positions, the latitude and longitude, in a star atlas or ephemeris.

By examining certain details that Aratus included in his descriptions, astronomers can determine at what latitude, and at what time period, the observations were made. Since the fixed stars move in a very slow orbit in relation to the sun, the rising and setting of the constellation positions are like a cosmic clock that can be read by accurate calculations. Using the information that Aratus supplies, such as the stars that are never seen to rise or set, astronomers were able to determine the approximate date and the latitude at which his descriptions would be accurate. In order to see the constellations as Aratus describes them, the appropriate latitude would be 38E or 39E north. That latitude and other technical information have pointed to the conclusion that the observations recorded by Aratus were recorded not in Greece at all, but on the island of Crete.

Investigators assumed that the time period for the appropriate positions of the constellations, that is, when they aligned with the celestial coordinates that are described in the poem, would place them at locations appropriate for the fourth century BCE. This is the time when the positions were determined and 'published' by Eudoxus. But to the amazement of all (all four of us who are interested in this), astronomers have determined that the only possible time when these positions were accurate would move the observation date to a much earlier time, approximately 2600 BCE (+ or - 800 years). This is not just one opinion; three separate astronomers have confirmed this ancient date for Aratus' constellation positions. Analysis of the astonomical data from the poem places the time of the celestial reading at least 1500, maybe 2000, years before Aratus or Eudoxus.

The unexpected results of this investigation have raised another whole series of fascinating questions. How was this specialized astronomical information held and transmitted for such an enormous time span? How could an astronomer in ancient Greece obtain and record the results of observations of one to two millenia previous? It has been suggested that Eudoxus may have seen an older celestial globe that may have somehow survived. But it is doubtful that celestial globes even existed before the time of Eudoxus; Cicero says that Eudoxus invented them.[21] Did the formation of pictures have a role in transmitting this specific information? Could a written or carved record of some sort have survived from this early time? But who could have written or read it? (Linear B is the ancient script of Crete, based on Linear A not yet translated.) Another source of transmission is oral tradition. The means of transmission of this specialized information are perplexing, but the data survives.

Function of *Aratea* Manuscripts in Education

An often-repeated statement found in history and art history books is that the illustrated *Aratea* manuscripts were a fundamental work of reference for learning astronomy in the Middle Ages. One of the goals of this dissertation was to determine if this statement is correct. Were the *Aratea* codices the basic source of astronomical information at that time? Were there even any astronomers in the West during most of the medieval period? It appears that there were few, if any, astronomers doing any type of active studies during the medieval period, those involved with celestial phenomena were primarily looking back to the ancient knowledge of the Greeks and Romans. The goal during the Middle Ages was not directed toward expanding astronomical

[21] See Chapter 2, p 4

knowledge or making new discoveries, but to protect what had been transmitted from antiquity, and preserve it from error. The spread of learning inherited from Greek science had been a slow process in two directions; an eastward extension into Asia where it would be absorbed into the Islamic culture, and a weakened westward branch that was transmitted in the Latin West. These two traditions collided in the turbulent twelfth century and the process of dissemination and absorption occurred in the following centuries. After that period of transition and the assimilation of the 'new' material found in the writings and theories of Ptolemy, the course of astronomy changed significantly. Many medieval scientists "were prepared to challenge or modify significant elements in the tradition that they received".[22]

During the Carolingian period, Alcuin, Adalhard of Corbie, and 'the Astronomer' stand out for making new observations and commenting on celestial movements and recent cosmological activities. But until the twelfth century, there is very little record of actual astronomical activity, such as observations or calculations. The type of astronomical information that was available was rather simplistic, chiefly the allegorical material from Macrobius and Martianus Capella and the *Aratea* manuscripts. "It was of no great importance that the details of the poem correspond exactly with scientific facts. The lines of the poem were well turned and pleasing to the ear, containing graphic and accurate information about the stars, so that they served as an easy guide to the night skies."[23]

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[22] Goldstein, "Theory and Observation in Medieval Astronomy", in *The Scientific Enterprises in Antiquity and the Middle Ages*, University of Chicago Press, 2000, p. 213

[23] Saxl, "Illustrated Science Manuscripts in England", in *Lectures*, p.100

Through most of the Middle Ages, the *Aratea* texts appear in compilations with various other astronomical authors, which speaks to its didactic function. The fact that the *Aratea* were almost always bound in volumes with the same popular astronomical writings by Pliny, Macrobius, Martianus Capella, Hyginus and Pseudo-Bede, demonstrates that they were read and classified by their astronomical information. I have never seen them bound with classical literature, religious writings, or other poetry. Astronomical subject matter in *Aratea* manuscripts was limited mainly to the constellations, other celestial phenomena such as eclipses, comets, planetary brightness or transits were not addressed. Cosmological diagrams or rotae are often found in these anthologies, but they are associated with other authors, particularly Pliny or Bede, not with the *Aratea*. Although without diagrams, the *Aratea* usually did contain a map as a visual guide to the heavens. The inclusion of a celestial map, a panorama of the complete sky, indicates that medieval readers were interested in seeing the accurate placement of the constellations in their appropriate regions, and the majority of the constellations are pictured. Yet it is surprising that the Milky Way, although described in the body of the poem,[24] is never indicated in the celestial maps, nor are individual stars often marked. The chart of the celestial sphere enabled the reader to learn the whole sky of which they could only see a section, depending on the terrain, weather, the time of night and the season. Therefore a person who consulted an *Aratea* manuscript could learn the names and relative positions of the constellations from the text, and

[24] "If ever on a clear night, when all the brilliant (470) stars are displayed to men by celestial Night, and at new moon none in its course is dimmed, but all shine sharply in the darkness - if ever at such a time a wondering has come into your mind (474) when you observed the sky split all the way round by a broad circle, or someone else standing beside you has pointed out to you that star-emblazoned wheel (men call it the Milk), no other circle that rings the sky is like it in colour," Kidd translation

they could learn the general appearance of the mythological figures from the illustrations and the celestial map. But there is no way the text or pictures could teach you any practical astronomy or help you locate the constellations, if you didn't already know where they were, and what they looked like.

Without previous knowledge, it would be impossible for a medieval reader to learn to identify the actual designs of the constellations through consulting the text or miniatures in the *Aratea*, because the stars are not accurately placed. In addition, there is no indication of brightness or color, and rarely was any attention paid to exact numbers of stars. The constellation pictures, in some instances, relate to the shape of the star formations, but generally the stars have to be pointed out, as Aratus says, by "someone else standing beside you", relating their distances, brightness and order. Most of the constellations are illusions requiring a great stretch of the imagination, since the actual star patterns of the constellations rarely look like the pictures, any number of patterns could be formed by the same group of stars. Other societies have formed completely different pictures than the classical formations. The innumerable stars shining on a clear, dark night form a brilliant carpet mosaic of random orientations, they do not break up into natural shapes. In order for the *Aratea* manuscripts to relay any elucidative knowledge, it would have been necessary to already know the pattern of each of the star formations. I expect that most people did learn this basic information about nature at a young age, at least the circumpolar stars and the seasonal markers, such as Taurus, Orion and Virgo and other skylore. The format of the *Aratea* would relay the order in which the constellations appear, and the poetic verses would help

sky watchers to memorize which constellations would rise next. The pictures and stories in the manuscripts would further reinforce the celestial images.

The analysis of the didactic function of the *Aratea* is similar to the argument about stained glass windows in the well-known article, "Was Art Really the 'Book of the Illiterate'?"[25] Not really, it was necessary to already know the stories, otherwise the pictures were meaningless. In the same way, the formation of the constellations had to be known before reading the *Aratea* manuscripts; otherwise the information would be meaningless without accurate guides to mark the design of the figures.

Although you could learn the names of the constellations from the poem, you could not actually find them in the sky; it would be almost fruitless to try. If you already knew the formations, you could gain helpful infomation from the *Aratea*. The poem does provide guidance markers and techniques to learn certain aspects, "It takes four signs of the Zodiac together for the ocean to receive Bootes' setting. When he is sated with daylight, he occupies more than half of the passing night in the loosing of his oxen, in the season when he begins setting as the sun goes down." (585) The astronomy lesson is rather round about, but it can be memorized to learn the information. The poem also says to look for the paranatellonta, the constellations that rise with the zodiacal signs, "if they are darkened by clouds or obscured by a mountain when they rise". (565) Perhaps the textual changes made through the medieval period were to eliminate the more

[25] Lawrence G. Dugan, Word & Image, Vol.5, No. 3, July-September (1989) 227-251"Words are not perfect and never can be, but they will always remain our most precise, if ever defective, mode of communication. By comparison, pictures can be interpreted as artifacts and be very useful also as 'sources' and as stimulants of new insights, but their correct interpretation can be corroborated only by reference to other sources, by allusion to what one already knows, and by the use of words to conduct an intelligible and fruitful discussion of the meaning of individual pictures. Pictures cannot 'speak' clearly, only words can. That is the long and short of it." 251

obscure passages and add the more practical information about the formation of the constellations. Therefore, although the astronomical information in the *Aratea* could not teach basic astronomy, there were useful facts to be found.

The *Aratea* may have been a part of the average liberal art education before the twelfth century, but astronomical education changed after that time. Astonomical texts became more detailed and challenging. The body of astronomical knowledge had expanded enormously. By the end of the thirteenth century, the astronomy found in the manuscripts of Sacrobosco achieved a secure, if limited, home in the university curriculum, and it remained so for the next four centuries.[26] His writings included a simplified discussion of the structure of the heavens, and provided a basic account of spherical geometry to support the mathematical astronomy of Ptolemy and his Arabic commentators. Although the treatise of Sacrobosco was the most influential textbook in the thirteenth century, a wide range of other astronomical texts by Greek, Latin and Arab authors were also in circulation for students of astronomy. During this century the astronomical writings of Robert Grosseteste (ca.1175-1253) became available, as well as his original research and discoveries in meterology, light, color and optics. Roger Bacon (ca.1214-1294), a Franciscan scholar who promoted the scientific method, included new research in astronomy, astrology and alchemy in his writings. Bacon promoted experimental research in the physical sciences rather than strictly relying on ancient authority. Sacrobosco's *De sphaera* had moved to the forefront as the preferred text for astronomical studies from the thirteenth to the seventeenth century. *Aratea* manuscripts were no longer reproduced or consulted as sources of

[26] McCluskey (1998) 196

astronomical information by the thirteenth and fourteenth centuries. In the company of the scientific writings of these great intellects and learned scholars, the elementary astronomical information found in the *Aratea* manuscripts was of little concern in the academic world. Scholastic commentaries and guides to the study of arts occasionally mention Aratus and Hyginus, but not their specific texts.[27]

It is of interest to note that each of the three periods of renewal discussed in this study were times of actual rediscovery and recovery of earlier writings. These three renaissances were each followed by periods in which scholars were able to exploit the work of their predecessors. Each of the renaissances provided the material for the next period of advancement and contributions to the body of held knowledge. It is not surprising to find that the greatest writings and most original thought date from soon after one of the cultural revivals. Roger Bacon, Albertus Magnus and Thomas Aquinas were spurred to their great achievements in scholasticism and scientific method by the rediscovery of the writings of Aristotle and Ptolemy. Tycho Brahe, Kepler, and Galileo realized their greatest discoveries after the renewal of ancient writings during the Italian Renaissance.

This study has shown that the astronomy in the *Aratea* had educative value, but in a limited way. Some didactic features were included, but that does not seem to account for the lasting appeal of the manuscript tradition. The function of the illustrations on the other hand is a fundamental characteristic, since the *Aratea* are rarely without the full cycle of miniatures.

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[27] McCluskey (1998) 197

Function of *Aratea* in History of Art

This study has identified and examined the body of constellation illustrations that appear in *Aratea* manuscripts, dating from the ninth through the fifteenth centuries. The *Aratea* were as rich in visual themes as they were in astronomical data. The poetic descriptions enlightened and entertained audiences, and enabled readers to create pictures in their minds. Were the illustrations explaining the text, or was the text merely subsidiary to the pictures? Visual representations of the subject matter and mythological characters from antiquity were abundantly available in the early Middle Ages. Therefore the astronomical poem offered the ideal theme for a medieval picture book and was copied over and over. For the most part, these illustrations owe their appearance and iconography to the classical heritage; their prototypes in all probability were established in the last centuries of the Roman Empire. "Clearly there must have been illustrated manuals or pattern-books of some sort", since so many mythological scenes from wall paintings, mosaics, carvings, and other media, appear in standardized form.[28] The images on the Farnese Globe too correspond exactly with the descriptions of Aratus.

As seen in Chapter 2, the *Aratea* were not unique in that they included images, since other classical writings, for instance, Homer's *Iliad,* Virgil's *Aeneid,* and Terence's plays were all abundantly illustrated, and manuscripts of these authors also survive from the early Middle Ages. Illustrations served primarily as functional and didactic companions to the texts and complemented the textual adaptation of the classical sources.

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[28] Cameron 220

Through the course of this study, I have examined only about half of the surviving *Aratea* and have managed to collect just a limited number of illustrations that have been published, or are available online. It is dangerous to make comprehensive statements about the entire corpus of Aratean miniatures for obvious reasons: they vary greatly, the illustrative tradition lasted for over 600 years, and manuscripts were produced throughout Europe. Therefore it is more suitable to allow each individual manuscript to stand on its own merits, considering each example as representative of its historic perspective and cultural milieu. But in a broad sense, some conclusions can still be drawn, as all of the manuscripts belonging to the Aratean poetic tradition do share certain characteristics.

Except for the ninth and tenth-century manuscripts of Cicero's *Aratea*, most codices that I have seen carry the complete cycle of forty-two to forty-eight constellations, as well as miniatures of the Sun, Moon and five planets. They commonly begin with one or more celestial maps, and they more or less share the same order of the constellations, which begin with Draco and the Two Bears and end with Procyon. The constellation pictures most frequently appear before the text descriptions, simply inserted between sections of text. Although the miniatures of the Leiden *Aratea* are full-page, framed, and set apart with colored backgrounds, the majority of illustrations are small and unframed, as if free-floating in space, with no background color or setting. In some manuscripts, the text runs around the images, as they bump into each other. The most common type of painting in *Aratea* manuscripts is a conservative line-drawing and color-wash technique. When reading the paintings against the text they illustrated, artists do not seem

to utilize the information in the text; for the most part, they do not follow the visual clues stated in the poem.

Aratean Art in the Ninth Century

As seen in Chapter 4, the Carolingian Renaissance was a major chapter in the history of scholarship and science. "Classical conceptions, literary, philosophical, scientific and artistic, had survived throughout the centuries, particularly after they had been deliberately revived under Charlemagne and his followers."[29] The artistic productions and manuscripts that they created matched their advances in other fields and genres. The intellectual and cultural sphere fostered the collection and translation of classical scientific texts during the ninth century, when the process of classical borrowing begins. The miniatures in ninth-century *Aratea* manuscripts captured the essence of classical art, since the accomplished artists were able to clothe classical subjects in classical form. Even though the thirteen *Aratea* manuscripts that survive from the ninth century all seem to draw from classical sources, they are far from imitative. This fact points to the existence of a variety of models from which the artists could draw astronomical inspiration, but it also speaks to the abilities and creativity of Carolingian artists. Similarities among some of the ninth-century miniatures point to a common ancient source, perhaps a Late Antique prototype. Although it is tempting to single out the ninth-century illustrations as the most creative with the highest quality, it is important not judge the manuscripts from later centuries by their high standards.

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[29] Panofsky (1955) 40

Artists restored, reinvented, and recopied images that had been preserved by Carolingian illuminators from antique sources. These conservative classical illustrations were continually recycled in *Aratea* manuscripts. Artists who produced the tenth and eleventh-centuries copies of the Carolingian manuscripts succeeded in recapturing the antique models with surprising fidelity. The quality and faithfulness to earlier models can be observed for example in the two copies of the Leiden *Aratea*, Boulogne-sur-Mer MS 188 and Bern MS 88. Nevertheless as time goes on, some iconographic changes are introduced into the illuminations. Observations of the sky which could have been used to verify or make the pictures more accurate are not employed.

During the eleventh century, monasteries were the leading centers of religious, intellectual and artistic life. Bishops, religious and monastic leaders moved to the forefront as patrons of art and culture. The Ottonian court in imperial Germany patronized culture and artistic production, but the political structure of the Empire was different from their Carolingian model. The emperor could not legislate for the entire empire, as other dukes and dukedoms were independent.[30] Although seven *Aratea* manuscripts are extant from the era of the Ottonian Empire, it seems that none were produced at their court scriptoria.

Aratean Art in England

For the most part, production of *Aratea* manuscripts in England was confined to religious centers and to Cicero's version. There both the text and the picture cycle were expanded to include more of the constellations missing from Cicero's surviving fragments. As stylistic changes developed in English monastic scriptoria, Romanesque in particular, these modifications

[30] Colish 162

were reflected in the Aratean miniatures as well. Mythical creatures from the *Aratea*, like the sea monster, centaur, snakes and dragons, became perfect prototypes for the fantastical contorted beasts populating Romanesque sculpture and decorative motifs. Dodwell has shown how images from astronomical manuscripts were copied and adapted as sources of Romanesque decoration, particularly at Canterbury in the tenth century.[31] When investigating manuscripts of Cicero's *Aratea* that survive in England, it is easy to see that scribes and artists were interested in correcting details and adding to the small number of constellations, only twenty four, in their prototype, Harley 647. Artists sometimes used their own imaginations, creating images of the constellations that were far removed from their classical prototypes. Costumes worn by Boötes and Aquarius, for example, are drawn from other sources, quite different from those in classically-inspired miniatures. Architectural and landscape settings were sometimes created for the constellation figures, which is definitely out of character for personalities situated in the sky. But the production of *Aratea* manuscripts in England appears to terminate in the twelfth century.

Aratean Art in the Twelfth Century

Contact with Arabic astronomical art revealed that there were similarities with western art, but differences as well. The fact that Arabic astronomical codices produced from the tenth to the twelfth century were illustrated with an almost identical cycle of constellation figures as the *Aratea* manuscripts points to their use of Late Antique prototypes. A prime example is al-Sufi's *Book of the Fixed Stars*, an original scholarly endeavor, designed with illustrations and created in Baghdad in the second half of the tenth century. Even though there was little contact with

[31] Dodwell (1954) 60-62

Western manuscript traditions, the exact same Zodiac and constellation images appear in Islamic codices. The original autograph work by al-Sˆf′ does not survive, but Bodleian Marsh 144 dated to 1009-1010 is a close copy. Since it was derived from the writings of Ptolemy, it was rooted in the classical tradition. It is extremely doubtful that Islamic artists were visiting European royal or monastic libraries to view or copy their astronomical manuscripts. The original Hellenistic texts, as well as Late Antique copies, had been preserved in Arab libraries, among these were probably illustrated examples that supplied the exemplars. The artistic adaptation of classical sources for astronomical art in the Arabic East mirrors precisely the format of astronomical art in the Latin West. The transformation of Late Antique forms and motifs into new, distinctly Arabic manuscript miniatures precisely parallels the adaptation of the classical exemplars in the West. Though the Arabic manuscripts retained the classical images in names, number, and order of the constellations, the clothing, attributes and iconography naturally were based on Near-Eastern culture. The drawings in manuscripts of al-Sˆf′ and Abˆ Ma'shar brought Oriental influences to astronomical art in the West, along with many changes. But these changes were confined to the manuscripts based on these Arabic writings.

Discussing the manuscript illuminations of Michael Scot, Panofsky writes, "the genuine images had fallen into oblivion and were replaced by others-partly newly invented, partly derived from oriental sources-which no modern spectator would ever recognize as classical divinities".[32] Panofsky also writes, "Wherever a classical image, that is, a fusion of a classical theme with a classical motif, had been copied during the Carolingian period of feverish

[32] Panofsky (1955) 49

assimilation, this classical image was abandoned as soon as mediaevel civilization had reached its climax, and was not reinstated until the Italian Quattrocentro."[33] I would disagree as Panofsky is comparing two different manuscript traditions. The classical images of the *Aratea* were not abandoned, but still produced in smaller numbers, retaining the traditional iconography. The newly-invented iconography found in the illustrations of Michael Scot and other Arabic derivatives brought new and exotic pictures specific to those traditions. Astrological theories, such as the paranatellonta, are illustrated, and each traditional Sign of the Zodiac was overrun with thirty decans, each with its own name and face, a concept of Egyptian origin. The seven planetary gods had been assigned 'children', representatives of attributes of human nature that are governed by each planet.[34] These were an additional series of images for newly-introduced concepts based on astrology, they did not eliminate the antique motifs, but existed along side them. Michael Scot's treatises were not classically-based literature, but were written by him in the thirteenth century. They became quite popular and were copied many times. His work incorporates astrological theory chiefly from Arabic sources, his images were possibly derived from Arabic manuscripts as well, but were updated with a more elegant, courtlike appearance.

Aratean Art in the Fifteenth Century

After many centuries of declining interest in *Aratea* manuscript production, it was amazing to find no less than twenty-seven manuscripts surviving from the fifteenth century. The resurgence of interest in the classical past included - literature, mythology, the ancient gods,

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[33] Panofsky (1955) 50

[34] A doctoral dissertation has been written on this subject, Gwendolyn Trottein, *The Children of Venus in Late Medieval and Renaissance Iconography,* University of Illinois ar Urbana, 1986.

astronomy and art - all the components of the Aratean artistic tradition. Apparently the *Aratea* manuscripts, where the classical gods and heros were still alive, were a vital ingredient in the renewal of pagan antiquity in intellectual and artistic life. The mythological images of Greek and Roman astronomy were too deeply ingrained to be changed; pagan imagery was adopted and used in the artistic programs of the fifteenth century. Some describe the Renaissance as the nostalgic dream of a lost world of order and beauty. In Seznec's multi-faceted study of the survival and metamorphosis of the pagan gods, he states, "How much can be learned of the history of civilization from a study of their metamorphoses and reincarnations".[35] This enthusiasm for the classical past was most felt in Italy, it was there that the revitalization of *Aratea* manuscripts was strongest, but it spread to other areas as well.

Were these astronomical manuscripts considered new symbols of status, picture books for palace libraries, or were they read for their scientific information? Presenting four richly-illuminated *Aratea* manuscripts produced at the court of Naples as an example; perhaps they were all commissioned at once and passed on among the high court or church officials as gifts. The *Aratea* manuscripts furnished the perfect subject matter, impressive and lofty, a suitable alternative for royal or private libraries already loaded with numerous religious books, Bibles, Psalters, and Books of Hours. Although the topic of another study, perhaps the multiple gift giving accounted for the increase in *Aratea* production in the quattrocentro. A complete investigation of how the *Aratea* functioned and what part they played in this cultural renewal is

[35] Seznec 149

unfortunately beyond the scope of this study. A closer look at how some specific areas were treated in the art can bring a fuller understanding to the tradition.

Treatment of the Planets

In astronomical lore, the constellations were depicted as mythical figures, both larger-than-life human personalities and trustworthy animals, who embodied the ancient legends. The main characters of the myths were frozen in time, and their stories were fixed firmly in the heavens and unchangeable. In contrast the five planets, along with the Sun and Moon, were constantly changing their positions among the fixed stars. In the early Middle Ages, the five planets seem to have been of little or no significance outside of 'book' astronomy before the Carolingian age. "Only in texts on the liberal arts or in astronomical texts incorporating theoretical elements did the planets put in a more than perfunctory appearance."[36] The planets were difficult to plot in a predictable course as they are not always visible and their movements are erratic. Usually they progress in a forward direction, but sometimes pause, and then move in a retrograde motion. For these reasons, the planets are only briefly mentioned by Aratus and in the Latin translations. Because of their seemingly self-directed motions, they were handled in a different way than the dependable and predictable constellations.

In the Greco-Roman world, the 'seven planets' were treated as divine forces interacting with human life, creating and directing fates and fortunes. The planets were not just human or semi-human characters caught up in moralistic fables like the constellation figures, but were considered gods with superhuman powers. Numerous temples and monuments had been built to

[36] Eastwood, (1993) 161 He discusses this issue in his book, The Revival of Planetary Astronomy in Carolingian and Post-Carolingian Europe.

honor the Roman gods: Mercury, Venus, Mars, Jupiter and Saturn in their various manifestations. Remnants of these pagan temples and ruins of cult statues survived in all parts of the former Roman Empire. Reminders of the gods of pagan religions could be found in many antique artworks, frescoes, statues, and relief carvings. To combat and eradicate these vestiges of pagan religious cults, the Christian Church needed to reverse the previous high esteem and reputation of the planetary gods. In the later Middle Ages, these alien images of 'the Other' were represented within the 'visual value-system' of the Church in order to control and eventually negate the foreign gods by distortion and effacement. Michael Camille, in *The Gothic Idol*, expresses the dilemma, "The Christian Church was never in doubt that idolatry should always be condemned; the perennial debate was how to define and separate 'correct' visual representations from incorrect idols and how to operate within that definition".[37] The planetary gods had to be toppled from their pedestals.

In view of these complications, the illustrations of the five (or seven) planets in *Aratea* manuscripts are treated differently than the constellations, their depiction is very conservative, for obvious reasons. Just as the planets were short-changed in the textual descriptions, their illustrations are minimal as well. Depicting the images of the constellations in astronomical manuscripts was never a problem in a Christian-dominated society; Andromeda, Perseus, Hercules, and the other heroes appear regularly in illuminated manuscripts, complete with their classical iconography and attributes. But in contrast, representing the five planets anthropomorphically, in their easily-recognized human guises, could be an affront to Christian

[37] Camille, The Gothic Idol: Ideology and Image-making in Medieval Art, Cambridge University Press (1989) p. xxvii

morality, honoring the pagan gods. On other hand, the planets were an important component of cosmology and could not be totally ignored. Statues and representations of the planetary gods were considered pagan idols, expressly forbidden by the Second Commandment. To show the planets as large and powerful figures could be interpreted as honoring pagan idols and acknowledging their astrological mastery over human destiny.

This dilemma required careful consideration by medieval illuminators**.** How do you adopt the knowledge, science, philosophy and mythology of another culture, but negate and condemn their religious system? Carolingian creativity resolved this difficulty by representing the planets as a group, rather than full-page miniatures, downplaying their significance and picturing them as disembodied heads. This compromise allowed artists to illustrate the five planets in their traditional symbolic representations, but not give undue attention nor allude to their previous roles as pagan gods, directing the course of human life on earth. The illustration of the five planets in the Leiden *Aratea* is treated in the same manner as the constellations, for it has the same blue background and frame seen in the other illustrations. But the planets are pictured as tiny heads with little acknowledgement of their former divine powers, and there is no text to exalt them. Most *Aratea* manuscripts treat the planets in a similar manner, all those that I have examined picture the five planets in this way, as small heads; none are shown as full-page or full-body illustrations. In some later manuscripts, the illustrators would avoid the whole issue and just represent the planets as stars, as in the *Liber Floridus*. I suggest this treatment of the planets is purposeful, but it is possible that artists are merely continuing an antique prototype.

The two other 'planets', the Sun and Moon, are included in most *Aratea* manuscripts of Germanicus. They are most often painted in action scenes, embodied in human form with their distinctive iconography, directing their respective chariots across the sky, sometimes on the same folio. The illuminations of the Sun and Moon most often appear at the beginning of the astronomical text, after the biography of Aratus, when included. Occasionally a miniature of Jupiter riding his eagle is painted at the start of the poem where he was honored in the proem by Aratus. Only one Germanicus manuscript, National Library of Wales MS 735C, includes, on folio 4, an image of Jupiter receiving inspiration from his Muse, quite unusual[38].

After acquaintance with the illustrated Arabic manuscripts, depiction of the five planets in the Christian West begins to change. *Aratea* codices continue their traditional subdued display of the planetary gods, but in other astronomical manuscripts, images of the planets begin to appear in a variety of new ways. The planets are no longer ignored or downplayed, instead they become the centerpieces in a new cycle of images and begin to circulate in thirteenth-century astronomical anthologies.

By the fifteenth century, there are numerous astronomical and astrological illuminated manuscripts produced that freely depict the planets as large scale, full-page celebrated figures. In an astrological manuscript from the library of Francesco Sforza (1400), a running Jupiter is depicted, within concentric, iridescent circles which include the band of fixed stars.[39] Jupiter appears naked, but for a strategically placed scarf, and holds a scepter in his left hand and arrows

[38] This eleventh -century manuscript was probably made in the Limoges region. The text and illustrations can be viewed on online at the Library of Wales website, but not printed.

[39] The manuscript is titled, *De sphaera*, (1450-60) Modena, Biblioteca Estense, Lat. 209, discussed in *Treasures from Italy's Great Libraries*, Jupiter, f. 6v.

in his right with a quiver slung over his shoulder. Smaller medallions at his feet contain the Signs of Pisces and Sagittarius, who is pictured as wholly human. On the Earth, below the realm of the powerful planet, are his 'children' shown taking part in daily-life activities that are ruled by Jupiter, such as trade, agriculture and banking. On another double folio, 10v-11, Mercury is shown holding a bag and caduceus, symbols of wealth and medical knowledge. The Signs of Gemini and Virgo are depicted in the medallions. The facing folio represents activities under the influence of Mercury.

Treatment of the Signs of the Zodiac

In *Aratea* manuscripts, illustrations of the twelve Signs of the Zodiac are not singled out as a separate unit, nor are they treated differently than any other constellation figures. Each Sign is addressed in order as its particular area of the sky is reached in Aratus' original systematic arrangement. Aratus discusses the zodiacal constellations and mentions that the planets "circulate all the way through the twelve figures of the zodiac".[40] He emphasized their importance as markers for the transit of the Sun, Moon and planets, and their significance for calendric purposes.

Although the Signs of the Zodiac have become closely connected with astrological symbolism and predictions, there is no association with astrology in the *Aratea* tradition. An important segment of astronomical art, although not a part of this study, is the tradition where the motifs of the twelve zodiacal signs are removed from their celestial matrix and joined with the occupations of the months to indicate time and its passage through the years. In artistic

[40] Line 456, Kidd translation

representations in the Christian world, the Signs of the Zodiac are most often linked with the Labors of the Months. This motif existed in the classical world, seen in floor mosaics and in the Calendar of 354, but is another Christian adaption of astronomical images never introduced into the *Aratea*.

The Signs, along with the Labors, assume a religious connotation, linked with the liturgical year of the Church. The illustrations are purely symbolic of the yearly zodiacal cycle in the heavens and the rotation of agricultural labors on the earth. In this situation, the Signs and Occupations signify humanity's place in the rhythmic order and present a connection between the toils of earthly life and the joys of the eternal heavens. These patterns of Signs and Occupations were well established in artistic form by the twelfth century changing gradually to become more experimental in the fourteenth and fifteenth centuries. The Signs and Labors were often carved on Romanesque and Gothic church portals and facades.[41] Manuscript illustrations of the Signs and Labors become more impressive, advancing from the tiny roundels, sometimes take over the whole page. Among the earliest surviving medieval examples that represent both Signs and Labors is a ninth-century manuscript of Bede's *De rerum natura* made in Regensburg.[42] The most outstanding example is the *Très Riches Heures*, illuminated by the Limbourg Brothers for Jean Duc de Berry in 1413-16.[43]

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[41] To name a few, Vézelay, the Abbey Church of St. Denis, Chartres Cathedral, and Amiens Cathedral.

[42] Munich, Bayerische Staatsbibliothek, Clm.210

[43] A new publication discusses the appearance of the Signs of the Zodiac in calendars found in Books of Hours and in sculptural form decorating medieval cathedrals, *Time in the Medieval World: Occupations of the Months & Signs of the Zodiac in the Index of Christian Art*, Colum Hourihane ed. Princeton University, 2007. The publication provides an extensive list of manuscript illustrations of the zodiacal signs.

In spite of the strong presence of this double motif in Christian art, it was not conveyed to the *Aratea* manuscripts. I have seen no examples of the Labors of the Months combined with the Zodiac, nor any special treatment of the Signs of the Zodiac. The Signs retain their classical iconography, which is discussed further in Appendix C.

The Iconography of Gemini

The depiction of the constellation of Gemini in manuscript illuminations has been especially fruitful as a subject of investigation. The iconography of the twins, Castor and Pollux, also known as the Dioscuri, has at times been intermingled with a completely different set of twins from Greek mythology, Amphion and Zethus.[44] These not so famous brothers were twin sons of Zeus and Antiope associated with the founding myth of Thebes and the construction of the city walls.[45] The musician Amphion played enchanting tunes on his golden lyre given to him by the god Hermes, which magically caused the stones of the walls to rise and set themselves into position. Brother Zethus married the nymph Thebe, for whom the city was renamed. Thus Amphion is celebrated in myth and art for the magical power of his music. The 'real' Gemini are Castor and Pollux, who were honored with many temples and worshipped in antiquity as protectors of mariners, particularly during the Roman period.[46] This interchange of identities and iconography can be traced to ancient Greece. In Christianity, Castor and Pollux have become

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[44] I would like to thank Professor Drew Armstrong, University of Pittsburgh, for pointing out the dual identities of Gemini.

[45] Reid, Jane D., *Oxford Guide to Classical Mythology in the Arts, 1300-1990*, Oxford University Press, 1993. Amphion and Zethus were twin brothers abandoned at birth and raised by a shepherd. They have been the subject of numerous paintings, poems, musical scores and even an opera. pp 93-5

[46] According to the *Oxford Guide*, they are mentioned in the Iliad, Pindar, Euripides, Ovid, and Hyginus. In addition to the *Aratea* manuscripts, they are illustrated in numerous paintings and remembered in poems. pp 369-73

associated with twin brothers who became Early Christian martyrs in the early fourth century, Saints Cosmas and Damian.

There is a variety of depictions for the brothers Gemini, as Castor and Pollux; they are often naked with just a cloak, carrying weapons or a shield. Their arms are usually intertwined indicating their love and care for each other. In later manuscripts, they are fully clothed with contemporary military garb. Depictions of their alternate identity show Amphion holding the lyre that enticed the stones and Zethus carrying a curving sickle. In *Aratea* manuscripts, Gemini are commonly represented as two male warriors, sometimes naked, holding long spears or other symbols of warfare; but often they take on the iconography of the lesser-known mythological pair. So far, the earliest depiction of Gemini in their alias disguise, that I have found, appears in the zodiacal floor mosaic at the Jewish synagogue at Sepphoris, dating to the fifth century CE, discussed in Chapter 2. The Leiden *Aratea* prefers the Amphion and Zethos iconography for Gemini, pictured in Appendix C. This interchange of iconography between the two sets of twins has not been investigated, and there has been nothing published as yet.

Treatment of the Stars

The individual stars of the constellation miniatures are of little concern in the majority of *Aratea* manuscripts. The stars are marked as small squares or dots, but their placement is completely random, far from faithful representations of the real stars in the heavens. Precise details about individual stars, such as their positions, numbers, brightness or even their names are not included. There is one exception in the naming of individual stars, the Pleiades, a group of seven stars within the constellation of Taurus, which are given their mythological names. Today

it is considered a star cluster, but the *Aratea* treat it as a separate constellation. Another star cluster is also found in Taurus, called the Hyades, I have seen it included in only one manuscript, Oxford, Bodleian Library, MS 614. It too is treated as a constellation.

Although the scholia in the *Aratea* manuscripts usually state the correct number of stars in each constellation and even their position, i.e one on the head, two on the feet, the artists rarely match the number or positions of the stars they depict with the text. For the most part, there is no connection between the illustrations and the real stars in the sky, even when spelled out in the text. If the purpose for including stars was a practical concern for recognizing the outlines of star groups, you would expect scientific accuracy. But this is not a consideration in the Latin West, until after the assimilation of illustrated Arabic manuscripts. Before that time, individual stars are merely sprinkled within the constellation figures or along the outlines. If viewers were interested in the actual positions of the stars in the sky, these manuscript illustrations would be of little value.

The care and accuracy of the placement of stars in Arabic manuscripts demonstrated that it was possible to depict and learn accurate positions of the individual stars within each constellation. The Arabic miniatures indicated the exact positions of the stars, relative to each other, and in addition gave accurate representations of the relative brightness of each individual star by varying the size. They also included the names of especially bright stars, which were easy to identify, and even marked those stars with noticeable color. The scientific precision of their star locations would have made the recognition of each constellation much more possible. Some Western manuscripts adopted this more scientific placement of stars, for instance Paris,

BibliothÞque de l'Arsenal MS1036.[47] But many artists of fifteenth-century Aratean codices, unaware of scientific precision, continued their random scattering of stars.

Numerous aspects of this illustrative tradition could be their own research topic, the variety of celestial maps and each of the forty-some constellation figures that decorate *Aratea* manuscripts are worthy of more study. The Labor of Hercules, the tragedy of the foreign king Cepheus, the chains of Andromeda, or the hunt of Orion could be tracked and investigated, as their iconography varies greatly through time and cultures. In perusing astronomical manuscripts, probably the most fascinating constellation image by far is the celestial ship (or half-ship), Argo. Unfortunately it was not possible to acquire pictures of most constellations, as libraries are very protective of their copyrights. Each intriguing marine image was entirely different, reflecting the current state of shipbuilding during the period. The ships alone contain a multitude of nautical information and would produce a fruitful study.

Mnemonic function of the illustrations

As part of classical education in the Middle Ages and into modern times, poems were often memorized to exercise the mind.[48] One of the earliest and longest-lived English poems consist of the well-known mnemonic verses defining the number of days in a month: "Thirty days hath September, April, June and November". In the same way, rhyming verses from the *Aratea* were memorized to announce the time of night, the time of the year, and the seasons, as the mythological figures slowly followed each other on their nocturnal journey across the

[47] This manuscript was made in Bologna in the third quarter of the thirteenth century.
[48] Carruthers (1990) 86

heavens. The formation of the constellations into distinctive and easily-remembered pictorial forms is itself a semiotic device to make otherwise indistinguishable stars more recognizable. Words and pictures are intimately and collaboratively related as devices for composing thoughts and memories.[49] Pictures can be found in the words themselves. "Moreover it is not so apparent where one medium leaves off and the other begins, for many of the pictures are visual puns and pictures of words and many of the words are verbal paintings and drawings."[50] This is especially true in Cicero's Harley 647, where the words of Hyginus actually form the constellation pictures.[51]

Beyond their astronomical significance, the planets and constellations had an additional important function in the past as a memory device. The Zodiac has had a long association with mnemotechnic traced back to Quintillian who used the constellations of the Zodiac as a source of memory places.[52] In her important study of memory in medieval cultures, Mary Carruthers expands upon the ground-breaking publication of Francis Yates.[53] Carruthers examines the use of devices, such as the alphabet, numbers and the Signs of the Zodiac applied as memory aides by medieval scholars, such as Thomas Bradwardine, Ramon Lull, Roger Bacon, and John of Garland.[54] Carruthers explains how the Signs of the Zodiac and the constellations were used as sets of images used for 'memory places' where the needed information could be 'stored' and

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[49] Carruthers (2002) 2

[50] Carruthers (2002) 2

[51] Only two other manuscripts follow this convention, Cotton Tiberius C. 1 (12th C.) and Göttweig, Stiftsbibliothek Codex 7 Bl. 20 (15th C.)

[52] Carruthers (2002) 229

[53] *The Art of Memory*, Chicago: University of Chicago Press, 1966

[54] Carruthers (1990) 95 and 110

then later ‘retrieved’ when visited by the mind. Carruthers states, “Ordered lists of this sort, I propose, were deliberately memorized in order to serve as potential mnemonic heuristics, ‘seats’ into which one could place the variety of diverse material one would acquire in one’s education and reading”.[55] In the early fourteenth century, the constellations of the Zodiac served as an elementary exercise in making mnemonic images in artificial memory systems.[56] Bradwardine (ca.1290-1349) used mental pictures from the traditional representations of the Signs of the Zodiac for mnemo-technical purposes.[57] Hugh of St Victor (d.1141) also used mental pictures of ‘a map and several different cosmological diagrams, including the Zodiac, the Six Days, and the angelic circles’ as part of his equipment for his mnemonic purposes.

These particular cases reveal an interesting ancillary function of the constellations and Zodiac, but these uses are not as well known, and are limited to a select few scholars, who applied them for formal training and exercising their memories. When considering a wider variety of the population, the more useful purpose for retaining the order and positions of the constellation names and pictures was for calendric and geographic purposes.

Astronomical Decorative Programs

Cosmic themes and constellation cycles were appropriate as ornamental schemes for decorating buildings, since architecture is midway between the macrocosm of the universe and the microcosm of the world of humans. Domes and apses by their very form allude to the hemispherical vault of the heavens and were often adorned with heavenly scenes featuring Christ

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[55] Carruthers (1990) 110
[56] Carruthers (1990) 16
[57] Carruthers (1990) 126

and the choirs of angels. During the fifteenth century, astronomical pictorial programs that had been mainly confined to illuminated manuscripts in the past expanded to decorate the palaces, chapels, and salons of the wealthy. Without repeating specific examples, it has been sufficiently demonstrated that astronomical iconography was customarily appropriated by rulers of church and state, from the time of Augustus through the fifteenth century. The list includes the Carolingian kings, Alfonso X, Frederick II, Henry VII, and members of the Italian nobility. Numerous representations can be found in books on the art and architecture of the Renaissance. Mentioning just one especially interesting example, Saxl examined the ceiling fresco of the Villa Farnesina, Rome, built by the papal banker Agostino Chigi (1466-1520) and painted in 1510-11 by Baldassare Peruzzi (1481-1536). The ceiling panels in the *Sala di Galatea* are arranged with the planets, the Signs of the Zodiac, and the paranatellonta, which Saxl recognized as encoding the date of Chigi's birth. Saxl calculated the particular date as December 1, 1466, which was later verified when Chigi's baptisimal certificate was discovered.[58] The decorative cycle of the *Aratea* manuscripts seems quite conservative when compared to the extravagant display seen in the astronomical programs of Renaissance palaces. The numerous applications of astronomical art all lead ultimately to the *Aratea*, the main channel for depictions of the heavens.

The constellation illustrations therefore fulfilled a wide variety of functions; in a broader sense, they provided entertainment and amusement to the medieval readers and listeners. In addition they provided pictorial evidence of classical literature and mythology from an earlier 'golden age'. The illustrations were a visual connection to an historic past with the illusions

[58] Saxl, "Villa Farnesina" in *Lectures*, 197-98

inherent in learning about the ancient gods, goddesses and heroes and their mighty or foolish deeds. Perhaps too the readers felt they were attaining 'scientific' knowledge through the manuscripts. The illustrations simplified and reinforced the learning process when studying basic astronomy.

5.2 OBSERVATIONS AND CONCLUSIONS

Rather than the fifteen or twenty *Aratea* manuscripts that I estimated would be the subject of this inquiry, I have been overwhelmed by the sixty survivals, most of which are illustrated with a full constellation cycle. This chosen research theme quickly became a topic of galactic proportions; to investigate all sixty firsthand would be impossible in the given time frame. Therefore I have taken a broader approach, establishing the foundations needed for further investigations. My focus has been directed on the larger picture of determining the scope and function of this manuscript tradition within the disciplines of art and science. Much effort has been extended in acquiring the information available on this body of work, and synthesizing it into one coherent picture in order to determine what avenues could be investigated. This initial accumulation of data on numbers, locations, authors, was necessary to establish a broader understanding of the elementary factors of the tradition.

In addition to comparing the text of the *Aratea* and other astronomical writings, it was necessary to investigate the significance of the art work inspired by the various traditions. A rich corpus of constellation pictures has traveled through the manuscripts of the Aratean tradition and

was a large component of this study. Art historian Kühnel states, "the relation between science and the visual arts, in general, and astronomy and the visual arts, in particular, has never been treated seriously and systematically".[59] Recognizing this need, the current study has investigated the life, history, appearance, and functions of this body of astronomical manuscripts and its illustrations.

The second chapter brought together, for investigation and comparison, the possible sources for astronomical imagery prevalent in the Late Antique and Early Christian periods. This additional background material pointed out the large variety of astronomical art that was available, and that may have inspired artists when creating the constellation cycles for the numerous ninth-century *Aratea* manuscripts. The sources for the archetypal astronomical images were many; such as frescoes, statues, ceramics, and calendars, in particular the *Calendar of 354*, which was shown to be a model for some of the astronomical illustrations in the Leiden *Aratea*. Other models may have been celestial globes one of which survives, the *Farnese Atlas*, upon its surface forty-one constellations are carved. The enormously-popular cult of Mithras used astronomical art to symbolize and conceal its secret doctrines. Frescoes and sculptures filled with celestial imagery were associated with their worship centers that were scattered throughout the Roman Empire, many can still seen. For some yet undiscovered reason, zodiacal mosaics appeared in many early Jewish synagogues. All of these representations were possible sources for *Aratea* illustrations, but the most probable sources were Late Antique manuscripts prototypes of the *Aratea* itself.

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[59] Kühnel (2003) 17

Important Components

Some intriguing aspects of this dissertation topic are singled out and reiterated:

the large number and variety of *Aratea* produced in the ninth century
the retention of the classical forms of the illustrations throughout the medieval period
the planetary configuration on folio 93v in the Leiden *Aratea*, which holds vital data for the history of astronomy
the lack of Christian infiltration into the text or into the illustrations

Related Issues not Considered

Many issues have just been touched upon in this study that require further investigation; for instance, the role of Byzantine influences on the *Aratea* manuscripts. The *Aratea* manuscripts had a separate tradition in the East, especially Constantinople. A Latin version of the *Aratea* was translated back into Greek, probably in Constantinople, and the cycle of constellation pictures was attached to these manuscripts, two examples survive in the West, at the Vatican and el Escorial. This is an important, yet unstudied, component for the study of the *Aratea*, but left for another dissertation.

Maps and diagrams are an essential component of astronomical manuscripts. The various types of celestial spheres found in Aratean manuscripts are another topic barely investigated. Astrology too is an immense topic in the transmission of astronomical knowledge and in the illustrative traditions. Much of the attention, study and mathematics in the field of astronomy was conducted, not for pure science, but for astrological purposes. Astrology was barely touched on here, as it does not play a significant role in *Aratea* manuscripts; but it was an enormous factor in the history of astronomical art. Astrological art created pictures to illustrate the concepts introduced through the principles of astrological theories. Some of these ‘new’ types of images,

such as decans, can actually be traced to ancient Egypt, Persia and India. Other astrological concepts that were illustrated were the paranatellanta, mentioned by Aratus, but brought to the West through the writings of Abu Ma'shur. The images of the planets accompanied by their 'children' is another astrological theory abundantly illustrated at the end of the Middle Ages. There have been few recent studies conducted in these areas since the work of Warburg, Saxl and Panofsky in the early twentieth century.[60] There is still much work to be done in analyzing and comparing the numerous astronomical and astrological manuscripts traditions.

Keys to recognize each writer

I hope this study has made clear the difference between a manuscript attributed to Aratus and an Aratean manuscript. To restate the issue, the *Phaenomena* of Aratus is written in Greek and was not in circulation in the Latin West during the Middle Ages. Any identification or discussion of the poetry of Aratus that appears in a Latin manuscript is derived from the Latin translations by Cicero, Germanicus or Avienus, or the two corrupted Latin versions, the *Aratus Latinus* or the *revised Aratus Latinus*.

One of the goals of this inquiry was to determine if there was a particular model or distinctive version for each of the three Latin authors that could be pointed out and easily recognized to simplify and categorize the various texts and illustrations. Would it be possible to establish guidelines or specific criteria for determining to which astronomical author, treatise,

[60] Two studies have been published on the illustrations of Abu Ma'shur, a PhD dissertation by Vicky Clark *The Illustrated Abridged Astrological Treatises of Albumasar*, University of Pittsburgh, 1979 and a study by Marie-ThérÞse Gousset, and J.-P.Verdet, *Liber Astrologiae,Georgius Zothoros Zaparus Fendulus*, Paris: Editions Herscher, 1989

poem or tradition unidentified writings belong? But as discussed in the earlier chapters, the process of accurately specifying the textual component of an *Aratea* or other astronomical manuscript is quite difficult, since the Latin versions became less and less pure and then even intermixed through time. The complicated textual situation is best left to specialists in that field. Most surviving *Aratea* have been identified and analyzed by text scholars, but the information is scattered and must be traced. The easiest of the Latin translators to recognize would be Avienus, considering that his Latin versions remain in verse format with no scholia and no illustrations. But circulation and interest in Avienus' *Aratea* was quite limited, and only three of his manuscripts survive.

When analyzing the history and circulation pattern of Cicero's *Aratea* manuscripts, there are basically two main chanels; one in England and one in Italy. Before the thirteenth century, the circulation of Cicero's *Aratea* was primarily centered in England where seven of his thirteen surviving manuscripts are now found. To summarize the listings in Appendix B, six manuscripts of Cicero belong to the first group, ultimately traced to Harley 647. Four Cicero manuscripts belong to the second family of texts produced in Italy, in which the *Aratea* material is very fragmentary. The remaining three are not part of the established groups, but are also derived from Harley 647, but through an intermediary. The distribution of Cicero's *Aratea* may have been more extensive in the Middle Ages, but we can only base this examination on those that are now extant.

A possible way to distinquish Cicero's *Aratea* could be established when examining the pattern of illustrations. Because of the framentary survival of Cicero's text, many of his versions

begin with the constellation Aries rather than Draco and the Bears. But this arrangement changes in later Cicero manuscripts as scribes and artists filled in the missing sections. Some of Cicero's *Aratea* have Aries as the first miniature and then the other eleven Signs of the Zodiac were inserted, before continuing with the following constellations. The Oxford manuscript, Bodleian Library MS 614, follows this format.

Germanicus' *Aratea* became the most widespread tradition, since his manuscripts circulated throughout much of Europe. It is also the most complicated with at least twenty-nine extant manuscripts that have been classified by text scholars into six different groups. There are four manuscripts in the first group of Germanicus' *Aratea*, derived from the Leiden *Aratea*, all can be seen in Appendix B. Surprisingly five different variations of Germanicus' *Aratea* survive from the ninth-century; again examination of the complex textual issue is best left to experts in that field. Although the poem and scholia vary in Germanicus manuscripts, the illustration cycles seem to follow the same basic pattern. After the celestial map, Germanicus *Aratea* often begin with a miniature of a huge eagle with wings spread, with Jupiter sitting in a commanding position, as Germanicus refers to the invocation of Zeus by Aratus. The full cycle of forty-two to forty-eight constellation miniatures follow, inserted into the textual material. The illustrations that I have seen mostly retain the classical appearance and iconography. There are no distinctive traits to the characterize them as belonging to Germanicus manuscripts only, since the illustration cycles in Hyginus and Ps.Bede manuscripts are often quite similar.

The audience for the *Aratea* manuscripts seems to concentrate around two obvious centers, the royal courts and the monastic communities. A large proportion of the surviving

manuscripts can be traced to the European nobility who commissioned luxurious copies for royal libraries or for gift-giving. The second dominant setting for *Aratea* production was monastic centers, in England especially until the twelfth century. Both patronage centers reduced their output in the thirteenth and fourteenth centuries, and both were revitalized in the fifteenth century, particularly the noble courts of Italy and the monasteries of Austria.. Although these two locales commissioned a large percentage of secular and religious manuscripts in general, it raises questions as to the particular function of the *Aratea* in these environments.

Continued life of the *Aratea* tradition

Surprisingly, the popularity of the poem did not end with the fifteenth century, and demand for illustrated copies of the *Aratea* did not cease when the technology of printing arrived. By that time, calendars, almanacs, encyclopedias, and celestial maps became readily and cheaply available; and the type of astronomical information found in the *Aratea* was no longer expedient for memorizing the patterns of the night skies. This leads me to question whether that was ever a practical function. The epic poetry of Aratus and the *Aratea* were prime prospects for the newly-invented presses, and were among the most popular early printed books. The astronomical poems were re-instituted into their original classic forms and again became ‘best sellers’, as outstanding examples of classical poetry. In Venice, Erhard Ratdolt, who became the finest publisher of scientific material in the incunabula age, produced the first printed editions of numerous astronomical works, including an edition of the *Aratea* with illustrations based on the Leiden *Aratea* manuscript. In addition to the *Aratea*, Ratdolt also published editions of Hyginus, Abu Ma’shar, and Sacrobosco. These incunabula have become collectors’ items now worth

thousands of dollars. When examing the collections of major university and city libraries, almost all possess an early printed edition of Aratus or an *Aratea*. The survey of the printed life of the poem with its illustrations is another aspect of the *Aratean* tradition that is worth investigating, but beyond the scope of the present study.

5.3 THE ROLE OF ILLUSTRATED *ARATEA* MANUSCRIPTS IN THE TRANSMISSION OF ASTRONOMICAL KNOWLEDGE

The primary focus of this dissertation, ultimately, is directed toward determining the role of the *Aratea* manuscripts in the transmission of astronomical knowledge in the Middle Ages. The process of transmission is essentially that of finding, preserving, and renewing the intellectual legacy from the past. This study has defined the main streams for transmitting astronomical information, comparing the type of information carried in each different tradition. But as in all aspects of the *Aratea* tradition, there is no simple conclusion to explain its role in the transmittal of knowledge, as it is not easily defined. When evaluating the overall role of the *Aratea* manuscripts in the transmission of astronomical knowledge, you need to define the type of knowledge concerned. The role itself was complex with implications reaching into the many different fields. And of course the role, or roles, of the *Aratea* developed and changed during the long course of transmission. There is no doubt that the information in Aratean manuscripts was valued as they were copied and recopied for over two thousand years. As seen above, the

tradition is important to modern scholars for it reached into many different disciplines, but how were they viewed by medieval readers?

After looking at the wide volume of sources, uses, functions, and transitions of the most important science, the following is a summary of the conclusions that can be drawn from the surviving evidence. The astronomical knowledge available in the early medieval period consisted of popular astronomy that was transmitted mainly through poetry and allegories. The advanced mathematical astronomical writings and heritage from the Greco-Roman world had been mostly lost to the Latin West. In that light *Aratea* manuscripts, from the ninth century onward, did have a large role in conveying popular astronomy including some elementary information on how the universe is structured. They were one of the few sources available for reading about celestial topics and they were entertaining. European production centers created at least fourteen new manuscripts, and probably many more, for libraries in the tenth and eleventh centuries.

After the twelfth century, the popular and simplistic astronomy found in the *Aratea* was of little interest and only one tattered manuscript survives from all of continental Europe, in addition to three created in England. The newly-transmitted astronomical material from Hellenistic sources brought more sophisticated technical information and the material from Arabic sources conveyed practical and astrological information. The *Aratea* had lost their previous function of communicating desired astronomical knowledge, if that was ever a primary function. The text and pictures took a back seat to astrological texts for a few hundred years.

During the fifteenth century, production of *Aratea* manuscripts flourished, but that renewed interest had little association with a quest for astronomical knowledge. The body of

astronomical knowledge in the Latin West had expanded greatly and encompassed a much wider spectrum and more advanced material. The strong involvement with the classical constellations and skylore at that time can be credited to the pursuit of classical antiquity and re-establishing its remnants. The astronomical subject matter itself was desirable reading material, but not for advancing or even transmitting scientific knowledge.

Therefore judging from the available evidence, except possibly for the early medieval period, I would argue that the *Aratea* actually had nothing, or very little, to do with learning astronomy or with transmitting astronomical knowledge. With continual text revisions, any scientific content in the poem became virtually non-existent. Evidence demonstrates also that, contrary to many opinions, its astronomical information was not vital for agricultural and navigational purposes. It is most likely that every medieval farmer was closely in tune with the cycles of nature and knew when to plant and when to harvest without memorizing the verses of the *Aratea*. The same situation applies to sailors, who were intimately connected with the rhythms of the sky and sea. Though it is not impossible that certain sections of the poem had become part of common folklore, memorizing over 700 lines of poetry, does not seem advantageous for the typical seaman. There are no indications that any *Aratea* were taken on ocean voyages. Constellation patterns can be learned in other ways than through studying classical poetry. Most probably knowledge of basic astronomy was acquired at a very young age, since you could not find your way at night without a basic understanding of the sky. It is incontrovertible that the *Aratea* were of no value for the reckoning of computus. If *Aratea*

manuscripts had no scientific, educative, or even practical functions or qualities, what then accounts for their lengthy survival?

The more probable reason for its lengthy life cycle was the appealing subject matter of Aratean manuscripts. Just as favorite movies are viewed again and again, musical scores are enjoyed repeatedly, and well-loved stories and family anecdotes are retold, the lofty themes of the heavenly realms bear repetition, savoring, and protection. The familiar characters and heavenly deities were comforting in their predictability and reliability. The variety of celestial topics had tremendous appeal as morality tales, exotic adventures and love stories. Young or old, wealthy or poor, abbot or noble, queen or nun, all could relate to the legendary personalities, deeds and misdeeds, and the astronomical subject matter. Foremost evidence for their value as books for entertainment is the cycle of illustrations that is almost always included. It has been demonstrated that the constellation pictures had no 'scientific' value. The fact that Avienus' version had not been illustrated, and was not as appealing, supports the entertainment purposes of the other two authors. Numerous *Aratea* manuscripts were created throughout the medieval period, not to learn astronomy or classical poetry, as the value of both had been basically lost, but to amuse and entertain, and at the same time, reinforce a favorite topic, the nocturnal motions and popular personalities of the heavens. The text and images of *Aratea* manuscripts were sources of pleasure and reflection with ties to classical antiquity that gave them a special power and mystique. Although *Aratea* manuscripts are basically mythological picture books, they were successful in preserving and transmitting the entire body of astronomical images intact from antiquity to the present day, which is a phenomenal success story.

Aratus created an imaginative vision of the heavens, crammed with poetic symbols and artistic signs that might be used for the benefit of those who wished to learn. Today astronomical imagery and poetry is relegated to historians and the historical past, no longer a vital part of the body of astronomical knowledge. But thankfully the writings of Aratus and the Latin translations have survived. I trust this dissertation has filled some of the gaps in knowledge, revealing the fascination and relevance of astronomy, and the need for further research. It may open outlooks to help orient other historians in understanding this complicated manuscript tradition. This investigation is far from complete as the subject matter is astronomical in all aspects; there are still existing lacunae in my inquiry, but hopefully no black holes.

APPENDIX A

Listing of Surviving *Aratea* Manuscripts

This appendix is a listing, as complete as possible at this time, of surviving Latin manuscripts of Cicero, Germanicus and Avienus, according to their current location and also by century. Through this listing, it is possible to determine elementary patterns of their production and circulation. Included for comparison is a list of the most important manuscripts of Hyginus, far from complete, since Hyginus is often intermingled with *Aratea* text. Another list is included of manuscripts of other authors relevant in the transmission of astronomical knowledge, again this list is far from comprehensive. In addition to handwritten copies of the *Aratea,* a listing of numerous incunabula argue for the continued interest in this astronomical poem into the printed era. Although I have not examined all of the surviving *Aratea* manuscripts individually, only thirty three from the sixty listed, four are not illustrated, and two manuscripts have Greek text, but are illustrated.

* Those manuscripts in bold print are ones I have examined - either by viewing the original manuscript, a facsimile, or a microfilm.

ARATEA MANUSCRIPTS

AUSTRIA

Göttweig, Stiftsbibliothek Codex Göttweig 7 Bl.20 (15th C.) Cicero
Göttweig, Stiftsbibliothek Codex Göttweig 146 (190) (second-half 14th C.) Germanicus
Salzburg, Universitätsbibliothek M I 36 (15th C.) Undetermined text
Vienna, Österreichische Nationalbibliotek Codex Vindobonensis Palatinus 107 (9th C.) Avienus
Vienna, Schottenkloster, Codex Scotensis-Vindobonensis 545 (15th C.**)** Germanicus

FRANCE

Boulogne-sur-Mer, Bibliothèque Municipale MS 188 (late 10th C.) Germanicus
Dijon, Bibliothèque Municipale MS 448 (11th C.) Germanicus
Monpellier, Bibliothéque interuniversitaire, Faculté de medicine, MS H. 452 (late 15th C.) Cicero, Germanicus and Hyginus
Paris, Bibliothèque nationale de France Lat. 5239 (10th C.) Germanicus with scholia
Paris, Bibliothèque nationale de France Lat. 7886 (late 9th) Germanicus with scholia
Paris, Bibliothèque nationale de France Lat. 7887 (ca. 10th C.) Germanicus with scholia
Paris, Bibliothèque nationale de France Lat. 12957 (9th C.) *revised Aratus Latinus*
Paris, Bibliothèque nationale de France Ms. N. Acq. Lat. 1614 (early 9th C.) *revised Aratus Latinus*
Strassburg, Bibliothéque Universitaire et Regionale 326 (lat.275) (10th C.**)** Germanicus

GERMANY

Berlin, Deutsche Staatsbibliothek Codex Phillipps 1832, lat.130 (873**)** Germanicus
Berlin, Deutsche Staatsbibliothek (formerly der Stiftung Preussischer Kulturbesitz), Lat. Oct. 149 (15th C.) Germanicus
Cologne, Dombibliothek Cod. 83 II (ca. 805) *revised Aratus Latinus*
Dresden, Sächsische Landesbibliothek Dc.183 (10th C.) Cicero with scholia
Wolfenbüttel, Herzog Augustbibliothek Codex Gudianus 132, (10th C.) Avienus

HOLLAND

Leiden, Rijksuniversiteitsbibliotheck MS Voss. lat. Q. 79 (9th C.) Germanicus
Leiden, Rijksuniversiteitsbibliotheck Voss. Lat. f.121 (11th C.) Cicero with scholia

ITALY

Florence, Biblioteca Medicea Laurenziana Codex Strozzianus 46 (14th C.) Germanicus with scholia

Florence, Biblioteca Medicea Laurenziana Codex Laur. Plut.89 Sup.43 (second half 15th C.) Germanicus with scholia

Palermo, Biblioteca Communale Codex Panormitanus 2Q.q.E.11 (15th C.) Germanicus with scholia and Cicero

Milan, Biblioteca Ambrosiana Codex Ambrosiana D.52 inf., (15th C.) Avienus, Cicero and Germanicus

Naples, Biblioteca Nazionale MS XIV.D.37 (third-quarter 15th C.) Germanicus with scholia

Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Barb. Lat. 76 (15th C.) Germanicus

Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Barb. Lat. 77 (15th C.) Germanicus

Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Lat.1324 (15th C.**)** *revised Aratus Latinus* with fragments of Cicero and Germanicus

Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Urb.Lat.1358 (15th C.) Germanicus with scholia

Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Urb.Lat.1653 (15th C.) Germanicus

Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Lat. 3110 (15th C.) Germanicus

Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Reg. Lat. 1801 (15th C.) Germanicus

Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Gr.1087 (15th C.) Greek Aratus/*Aratea*, illustrated

Siena, Biblioteca Comunale Degli Intronati, L.IV. 25 (15th C.) *revised Aratus Latinus* and fragments of Cicero

SPAIN

Madrid, Biblioteca Nacionale MS 19 (12th C.) Germanicus with scholia

Madrid, Biblioteca Nacionale Codex Matritensis 4691 (1465) Greek text

Madrid, Biblioteca Nacionale Codex Matritensis 8282 (15th C.) Germanicus

Madrid, Biblioteca Nacionale Codex de Metz 3307 (ca. 840) Germanicus

El Escorial, Scorialensis E III 390 (1490) Greek Aratus/*Aratea*, illustrated

SWITZERLAND

Basel, Universitätsbibliothek Codex A.N. IV.18 (9th C.) Germanicus and *Aratus latinus*
Bern, Burgerbibliothek Codex 88 (10th C.) Germanicus
Einsiedeln Stiftsbibliothek Codex 338 (10th C.) Germanicus
St. Gall, Stiftsbibliothek Codex 250 (ca. 889) *revised Aratus Latinus*, Cicero fragments
St. Gall, Stiftsbibliothek Codex 902 (ca. 837) *revised Aratus Latinus*, Cicero fragments

UNITED KINGDOM

LONDON - BRITISH LIBRARY

Harley MS 647 (mid-9th C.) Cicero with scholia
Harley MS 2506 (ca.1000) Cicero with scholia
Cotton MS Tiberius B.V. (991-1016) Cicero with scholia
Cotton MS Tiberius C.1. (1122) Cicero with scholia
Arundel MS 268 (13th C.) Germanicus
Additional MS 15819 (1470) Germanicus and *Scholia Sangermanensia*
Egerton MS 1050 (1480) Germanicus with *Scholia Sangermanensia*

OXFORD - BODLEIAN LIBRARY

MS Bodl. 614 (S.C. 2144) (first-half 12th C.) Cicero with scholia
Digby MS 83 (S.C. 1684) (mid 12th C.) Cicero with scholia
MS Laud Misc. 644 (S.C. 1487) (second-half 13th C.) fragments of *Aratea* with Bede

CAMBRIDGE

Trinity College, MS R.15.32 (ca.1000) Cicero with scholia

UNITED STATES

Cambridge MA, Harvard University, Houghton Library MS Typ 43 (ca.1425) *Aratea*
Cambridge MA, Harvard University, Houghton Library MS Typ 18 (15th C.) Greek text of Aratus
New York, Morgan Library MS M. 389 (1469) Germanicus with scholia

WALES

Aberystwyth, National Library of Wales MS 735C (first part-early 11th C: second part-late 11th C.) Germanicus with *scholia*

ARATEA MANUSCRIPTS BY CENTURY

NINTH CENTURY
Basel, A.N. IV 18
Berlin, Codex Phil.1832
Cologne, Dom.83 II
Dresden, Dc. 183
Leiden, Voss. Lat. Q.79
London, Harley 647
Madrid, Metz 3307
Paris, BN nouv. acq. lat.1614
Paris, Lat. 7886
Paris, Lat. 12957
St. Gall 902
St. Gall 250
Vienna, Scotensis-Vindobon. Pal. 107

TENTH CENTURY
Bern, Codex 88
Boulogne-sur-Mer 188
Einsiedeln, Codex 338
Paris, Lat. 5239
Paris, Lat. 7887 ?
Strassburg, BU et R
Wolfenbüttel, Codex Gudianus 132.

ELEVENTH CENTURY
Cambridge, Trinity MS R.15.32
Dijon, BM 448
Leiden, Voss. Lat. f. 121
London, Cotton Tib. B.V.
London, Egerton 1050
London, Harley 2506
National Library of Wales 735 C.

TWELFTH CENTURY
London, Cotton Tib. C.1
Oxford, Bodl. 614
Oxford, Digby 83
Madrid, B. N. Codex Matritensis 19

THIRTEENTH CENTURY
London, Arundel 268
Oxford, Laud Misc. 644

FOURTEENTH CENTURY
Florence, Stroz.46
Göttweig Stiftsbibliothek 146 (190)
Sienna, L.IV. 25 (late 14th)

FIFTEENTH CENTURY
Berlin, Lat. Oct.149
El Escorial, Scorialensis E III 390
Florence, Laur. Plut.89
Vienna, Schottenkloster 545 (521)
Göttweig, Stiftsbibliothek 7 Bl 20
Harvard U., Houghton Lib. Typ 18
Harvard U., Houghton Lib. Typ 43
London, Add.15819
London, Egerton 1050
Madrid, Matritensis 4691
Madrid, Matritensis 8282
Milan, Cod. Amb. D.52
Montpellier, H. 452
Morgan Library M.389
Naples, XIV.D.37
Palermo, 2 Qq. E. 11
Salzburg, M I 36
Vatican, Vat. Barb. Lat 76
Vatican, Vat. Barb. Lat.77
Vatican, Vat. Lat. 1324
Vatican, Vat. Lat. 3110
Vatican, Vat. Urb. Lat. 1358
Vatican, Vat. Urb. Lat. 1653
Vatican, Vat. Reg. Lat. 1801
Vatican, Vat. Gr.1087

ARATUS and *ARATEA* INCUNABULA AND PRINTED COPIES

UNITED STATES

Chicago, Newberry Library, fragments of *Aratea* by Cicero, Latin. Basil, ex Officina Hervagiana (1534)

Chicago, Newberry Library, *Phaenomena* in Greek, Oxonii, E Theatro Sheldoniano (1672)
New York, Morgan Library ChL 1013, *Scriptores Astronomici Veteres*, Germanicus, Cicero and Avienus, collection of astronomical writings, Venice, Aldus Manutius (1499)
New York, Morgan Library PML 78454, *Phaenomena* fragments, Germanicus, with Hyginus, Basel, Ioan Heruagium (1535)
Princeton University Library, Hvg. Grotii Batavi *Syntagma Arateorvm*, Leiden: Christophorvm Raphelengivm, Academiae Lugduno-Batauae Typographium (1600)
St. Louis University Library, *Phaenomena*, Germanicus, fragments of Cicero and paraphrase by Avienus (microfilm) Venice: Aldus Manutius (1499)
St. Louis University Library, *Phaenomen*a, Germanicus and other fragments of Germanicus' writings, with Manilius' *Astronomico*n (microfilm) Italy (1499)
Yale University, Beinecke Library, Astronomica. Aratus *Phaenomena* (Germanicus), Bologna: Ugo Rugerius and Doninus Bertochus (1474)
Yale University, Beinecke Library, Arati Solensis *Phaenomena*, Wittemberg: Melchior Lotther (ca.1521)
Yale University Library, Arati Solensis *Phaenomena* et prognostica, Cicero, Avienus, Germanicus cum eius commentariis. Coloniae Agrippinae, T. Graminaeum (1569)
Yale University, Beinecke Library, Arati Solensis *Phaenomena*, *siue Apparentia*, Basil: Sebastiuanum Henricpetri (1585)
Yale University, Beinecke Library, Hvg. Grotii Batavi *Syntagma Arateorum*, Leiden: Christophorum Raphelengium (1600)

HYGINUS MANUSCRIPTS

AUSTRIA

Vienna, Osterreichische Nationalbibliotek MS 387 (ca.818) Salzburg
Vienna, Osterreichische Nationalbibliotek MS Vindobonensis 51 (12th C.) German monastery
Vienna, Osterreichische Nationalbibliotek MS Vindobonensis 2269 (11-12th C.)

BELGIUM

Brussels, Bibliothéue royale MS10 078 (11th C.)

FRANCE

Montpellier, Bibliothéque interuniversitaire, Faculte de medicine H 334 (M group) Loire valley? (9th C.)
Monpellier, Bibliothéque interuniversitaire, Faculte de medicine, MS 452 (late 15th C.) also Cicero and Germanicus

Paris, BNF latin 8663, *De astronomia* (11th C.) monastery val de Ligericae, Loch in Coltineau
Paris, BNF latin 8728, *De astronomia* (late 9th or 10th C.) Monastery of St. Remigius, Reims
Paris, BNF latin 11127, *De astronomia* (ca.1000) Monastery of St Willibrod, Echternach
Paris, BNF olim nouv. acq. Phillipps 26235 (first-half 12th C.)

GERMANY

Berlin, Deutsche Staatsbibliothek Berol. Phillipps 1832 (9th -10th C.)
Dresden, Sächsische Landesbibliothek Dc.183 (10th C.) with Cicero
Munich, Bayerische Staatsbibliothek Clm 210 (9th C.) Regensburg
Munich, Bayerische Staatsbibliothek Clm 13084 (9th C.) Freising?

HOLLAND

Leiden, University of Leiden Library MS B.P.L.225 (12th C.)
Leiden, University of Leiden Library MS Voss. Latinus 8 84 (10th C.)
Leiden, University of Leiden Library MS Voss. Latinus 8E 15 (ca.1023) Adémar Chabannes
Leiden, University of Leiden Library MS Voss. Latinus 4E 92 (end 12th C.) French

ITALY

Florence, Biblioteca Medicea Laurenziana Plut.29. 30 (12th C.)
Florence, Biblioteca Medicea Laurenziana Plut.89 Sup. 43, with Germanicus (15th C.)
Florence, Biblioteca Nazionale Centrale MAGL. XI. 114, Vol. 1 (15th C.) Italian, identical to Vat.lat. 3110
Florence, Biblioteca Nazionale Centrale MAGL. XI.141 (second-half 15th C.)
Milan, Biblioteca Ambrosiana T.47 sup. (second-half 15th C.)
Milan, Biblioteca Ambrosiana, M 12 sup.(A) (ca.860) German monastery
Milan, Biblioteca Trivulziana, N. 690 (E.83), similar to Oxford Can. Misc. 46
Monza, Biblioteca Capitolare, Cod. F.9.176 (mid-9th C.), similar to Madrid MS. 3307
Pavia, Biblioteca Universitaria, Aldini 490 (second-half 15th C.)
Sienna, Biblioteca Comunale Degli Intronati, L.VI.25 (second-half 15th C.) Italian
Città del Vaticano, Biblioteca Apostolica Vaticana Codex Cod. Pal. Lat.1363, German (12th and 13th C.)
Città del Vaticano, Biblioteca Apostolica Vaticana, Cod. Reg. Lat. 123 (1056), monastery of St Maria Rivipulli
Città del Vaticano, Biblioteca Apostolica Vaticana, Cod. Reg. Lat. 309, St. Denis (third-quarter 9th C)
Città del Vaticano, Biblioteca Apostolica Vaticana, Cod. Reg. Lat. 1207 (mid-11th C.)
Città del Vaticano, Biblioteca Apostolica Vaticana, Cod. Reg. Lat. 1260 (9th C.) Fleury?

Città del Vaticano, Biblioteca Apostolica Vaticana, Cod. Reg. Lat. 1324 (15th C.) with Cicer and Germanicus
Città del Vaticano, Biblioteca Apostolica Vaticana, Cod. Vat. Lat. 645 (ca.840) with 'seven-book computus'
Verona, Biblioteca Capitolare CCLXI (late 15th C.)

SPAIN

Madrid, BN Ms. 3307 (c. 820-840) oldest surviving copy of the 'seven-book computus', facsimile published, Madrid, 1993, commentary volume by Manuel Sanchez Mariana.

SWITZERLAND

Bern, Burgerbibliothek 45 (mid-9th C.)
St. Gall, Stiftsbibliothek, Cod. 920 (9th C.) made at St Gall, *revised Aratus Latinus*
St. Gall, Stiftsbibliothek, Cod. 250 (9th C.) made at St Gall, *revised Aratus Latinus*

UNITED KINGDOM

Cambridge, Fitzwilliam Museum MS.260 (ca.1475) Mantua
Cambridge, Trinity College R.15.32. (11th - 12th C.) with Cicero
London, BL, Harley 647 (9th C.) scholia to Cicero
London, BL, Harley 2506 (1000) Fleury, scholia to Cicero
London, BL Cotton Tib. B.V. (11th C.) scholia to Cicero
London, BL Cotton Tib. C.I. (12th C.) scholia to Cicero
London, BL, Royal Ms. 13 A. XI. (12th C.) English
London, BL, Add. Ms.15819 (1470) Italian, with Germanicus
London, BL, Arundel Ms.339 (first-half 13th C.) South Germany
Oxford, Bodleian Library, Can. Misc. 46 (S.C. 19522) (last-quarter 15th C.) Florence?
Oxford, Bodleian Library Can. Class. Lat.179 (S.C. 18760) (third-quarter 15th C.) N. Italy
Oxford, Bodleian Library Digby MS 83 (S.C. 1684) (mid 12th C.) near Winchester
Oxford, Bodleian Library D'Orville 95 (16973) (ca.1000) German monastery
Oxford, Bodleian Library D'Orville 145 (11th C.) monastery of St Peter Gandavensis

UNITED STATES

New York, New York Public Library, Spencer MS 28. Padua (1465-70)
Baltimore, Walters Art Museum, Hyginus, *De astronomia*, Latin, 39 constellation drawings

APPENDIX B

A Brief Description of Surviving *Aratea* Manuscripts

This appendix provides an abbreviated descriptive listing of the sixty extant Latin *Aratea* manuscripts, including which are illustrated. The descriptions are as thorough as time and funding has allowed. For many of the manuscripts, I found only brief mention in various text editions, as there is little published information available. The manuscript traditions of Cicero, Germanicus and Avienus are each listed separately. Almost none of the surviving *Aratea* manuscripts consist of pure versions of the original poem by author, without scholia or insertions of additional material, the purest versions are mainly from the ninth century. The majority of the manuscripts listed are anthologies of astronomical texts that include the writings of one or more *Aratea* authors, accompanied by sections of Hyginus and/or fragments of other known and unknown authors that have been added to the prototypes through the centuries. Although this manuscript tradition has uncertainties, the surviving manuscripts of all three Latin versions of the *Aratea* point to a beginning in north-eastern France during ninth century; and very soon after that time another branch appeared in Italy.[521] The variety of texts and illustrations demonstrates the

[521] Reeve 23

unceasing interest in antique culture and in the *Aratea*.

LIST OF *ARATEA* MANUSCRIPTS

Greek Manuscripts

Fifty manuscripts of the original Greek *Phaenomena* are currently known, and all are described in J. Martin, *Histoire du texte des Phenomenes d'Aratos*. All of these fifty Aratus manuscripts have Greek text and are not illustrated. There are two exceptions; one illustrated Greek Aratus manuscript is in the Vatican Library, Vat. Gr.1087 (15th C.) and one in Spain, el Escorial, Scorialensis E III 390 (1490). These two Greek versions may be the *Phaenomena* of Aratus, or possibly a Greek translation of Germanicus or Cicero that circulated in Byzantine society. The fact that they are illustrated makes me suspect the latter. As far as I know, there has been no study of whether the Latin versions of the *Aratea* circulated in the Byzantine culture. There are also some surviving scraps of papyri containing the Greek text copy of the *Phaenomena* listed in Martin's history as well. Because the Greek texts are not commonly illustrated and are not part of the Latin *Aratea* tradition in the West, they are not included in this study.

Latin Manuscripts

The following is a limited description of each Latin Aratean manuscript, arranged by author, and by related groups of text, where known. Some scholars differ on these textual groupings. A select few of the illustrated manuscripts have been studied and an abundance of information has been published for these; but the majority have not, and there is little data available. My focus in this dissertation though is not to examine every manuscript individually.

My chief concern is the corpus of *Aratea* manuscripts in its entirety, its function or influence in society, its importance in the history of science, and especially its role in the transmission of astronomical knowledge. But in order to gain an understanding of the whole *Aratea* tradition, it is necessary to gather together the individual parts.

Already in the ninth century, there were at least five different versions of the *Aratea* circulating among European libraries. Bischoff groups the ninth-century manuscripts into five text families:

Group 1. Leiden *Aratea* (text family Z; Bischoff, a.a.O., S. 89-91)
Boulogne, BM MS 188
Bern, Burgerbibl. MS 88
Group 2. Illustrated Germanicus manuscripts (text family O; Bischoff, a.a.O., S.89-90)
Basel, Univ. B. MS. A N IV 18
Madrid, BN MS.19
3. *Aratea* of Cicero
London, BL Harley 647
4. Madrid, BN Cod. 3307 (Germanicus scholia)
5. *Recensio Interpolata* or *revised Aratus Latinus*
Paris, BNF, lat.12957
St. Gallen, Stiftsbibl. Cod. 902[522]

Ninth-Century *Aratea* Manuscripts

It was quite surprising to discover that there are at least thirteen Carolingian *Aratea* manuscripts extant from the ninth century; all but two are illustrated. None of the thirteen manuscripts has a 'pure' text, each has varying degrees of scholia, and most are included in anthologies with additional 'popular' astronomical writings. Ten have Germanicus or Germanicus scholia, and two are the text of Cicero and one of Avienus. The various textual

[522] Mütherich, *Die Bilder*, p. 153

complications were discussed in 4.1.3. For the illustrations, Carolingian artists copied classical models; but they demonstrated their skill by drawing on their own creativity and ingenuity as well. A basic feature of Carolingian art is 'the interplay between old and new, drawing on Roman and Early Christian precedents' and then transforming them according to contemporary tastes and interests.[523] Although I have not seen an example of the illustrations from every ninth-century survival, there must have been many visual traditions of constellation imagery from which the Carolingian artists may have modeled and drawn inspiration. This is obvious since the ninth-century miniatures are not based on the same prototype, but have great variety in their execution.

The following is a listing of the ninth-century *Aratea* manuscripts, more details can be found in their respective groupings.

1. Cologne, Dombibliothek Cod. Ms 83 II (ca.805)
2. Paris, BNF Nouv. Acq. Lat. 1614 (early 9th c.)
3. Basel, Universitätsbibliothek Codex A.N. IV. 18 (early 9th c.)
4. Madrid, Biblioteca Nacionale Codex de Metz 3307 (ca.820)
5. Leiden, Rijksuniversiteitsbibl. MS Vossianus lat. Q.79 (After 816-840)
6. London, British Library Harley MS 647 (9th c.)
7. Paris, BNF Lat. 12957 (9th c.)
8. St. Gall, Stiftsbibliothek MS. 902 (mid 9th c.)
9. St. Gall, Stiftsbibliothek MS. 250 (ca. 889) copy of MS.902
10. Dresden, Landes. MS. Dc. 183. (late 9th c.)
11. Paris, BNF Lat. 7886 (late 9th c.)
12. Berlin, Deutsche Staatsbibliothek Codex Phillipps 1832, lat.130 (873)
13. Vienna, Österreichische Nationalbibliotek Scotensis-Vindobon. Pal. 107 (9th c.)

[523] Kühnel 65

Manuscripts with Germanicus Text

Germanicus - Group I

T **Leiden, Rijksuniversiteitbibl. MS Vossianus lat. Q.79** (After 816-840)

Manuscript is discussed in Chapter 4; material presented there will not be repeated. MS Leiden is one of the almost 'pure' Germanicus poetic texts with no scholia, but it does have additions of Avienus' poem.

f. 1: missing
f. 2: Germanicus text
ff. 3-93v: Germanicus text with additions of Avienus text and full constellation cycle
ff. 94-95: text
ff. 96-97: blank

Miniatures: ff. 3v Draco with Ursae; 6v Hercules; 8v Corona; 10v Serpentarius; 12v Boötes; 16v Gemini; 18v Cancer; 20v Leo; 22v Auriga; 24v Taurus; 26v Cepheus; 28v Cassiopeia; 30v Andromeda; 32v Equus; 34v Aries; 36v Deltoton; 38v Pisces; 40v Perseus; 42v Pleiades; 44v Lyra; 46v Cygnus; 48v Aquarius; 50v Capricorn; 52v Sagittarius; 54v Aquila; 56v Dephinus; 58v Orion; 60v Canis with Sirius; 62v Lepus; 64v Argo; 66v Cetus; 68v Eridanus; 70v Pisces Magnus; 72v Ara; 78v Hydra with Corvus and Crater; 78v Anticanus; 80v Five Planets; 82v Four Seasons; 93v planetary diagram.

Missing: Jupiter on eagle (1v), Virgo (13v), Centaurus (74v), Helios with chariot (95v) and Luna with chariot (96v).[524]

T Boulogne-sur-Mer, Bibliothèque municipale MS 188 (late 10th c.)

Most probably executed at Abbey of St. Bertin, under Abbot Odbert, at current location since 1799. Reproduces Leiden *Aratea* or possible copy of third manuscript, a lost exemplar, source of MS Leiden as well. Caroline minuscule, 33 ff, decorated initials, first letter of each line enlarged, alternates in color. Text and images in excellent condition. Colors are green, orange with some violet and black Images do not fill whole page, aligned side by side with poem. Thirty-nine illustrations of constellations. Miniatures well-executed, similar to MS Leiden, follow in exact order, but often two or three on page.

Includes five miniatures missing from MS Leiden, Sun and Moon, both on same folio. Helios wears flowing red mantle, stands in chariot with four rearing horses and holds orb of Sun in left hand. Luna appears with two silver oxen pulling cart, carries unusually large torch. Has exact copy of planisphere from MS Leiden; with gold-leaf applied to Labors and planets. Planetary configuration includes four additional diagrams in corners; Eastwood identifies four

[524] Folio numbers of missing illustrations as per von Euw, *Die Builder*, 154-186.

smaller discs as Isidorean rotae.[525] Upper left disc shows five latitudinal zones of earth, (not usual Macrobius map), three habitable and two uninhabitable, arranged around central disc-like flower petals. Upper right disc derived from Isidore's *De natura rerum*, represents the paths of planets. Lower left disc shows hours of sunlight in three circles, at equinoxes, summer, and winter, derived from Martianus Capella. Lower right disc has round T-O map of earth at center of disc, twelve radial segments for winds.

ff. 1-19: Computus tables and calendar
ff. 20v-33: Germanicus *Aratea* text, no scholia, *Ab Iove principium magno deduxit Aratus*
ff. 30v-32v: *'Prognostica'* of Germanicus
ff. 32v-33: '*Prognostica*' of Avienus

Miniatures: f. 20 Celestial map; 20v Jupiter on eagle; 21 Hercules; 21v Serpentarius and Boötes; 22 Virgo and Gemini; 22v Cancer and Leo; 23 Auriga and Taurus; 23v Cepheus and Cassiopeia; 24 Andromeda and Pegasus; 25 Pisces and Perseus; 25v Pleiades and Lyra; 26 Cygnus and Lyra; 26v Aquarius and Sagittarius; 27 Aquila and Delphinus; 27v Orion, Lepus and Canis; 28 Argo and Cetus; 28v Eridanus and Pisces Magnus; 29 Ara, Centaurus and Corona; 29v Hydra, Corvus, Crater and Anticanis with Planets; 30 planetary diagram; 32v Helios in chariot (top), Luna in chariot (bottom).

Literature: Josephe-Henriette Abry, '*La constellation du flueve dans le ciel Greco-Roman'*, (1994) 103-110; *The Utrecht Psalter in Medieval Art*, Exhibition Catalog, Utrecht (1996) 200-201; Smeyers, *Flemish Miniatures from the 8th to the mid-16th Century*; Maurits, *The Medieval World on Parchment*, (1998) 38, *Medieval Mastery*: *Book Illumination from Charlemagne to Charles the Bold: 800 - 1475*, trans. Lee Preedy, Greta Arblaster-Homer, Turnhout: Brepols, (2002)136-37; Smeyers, Maurits. *Vlaamse miniaturen van de 8ste tot het midden van de 16de eeuw*. *D*e *middeleeuwse wereld op perkament*, Leuven (1998); Seznec (1980) 136; Reeve "*Aratea*", in *Texts and Transmission* (1983) 20; Colette Jeudy and Yves-Francois Riou, ***Les manuscrits classiques latins des bibliothéques publiques de france,*** Editions du centre national de la recherche scientifique, Paris (1989) 308-09**.**

T Bern, Burgerbibliothek MS 88 (ca.1000)

Also made at Abbey of St. Bertin, early eleventh century, presented to St. Mary's, Strasbourg, by Werinhar, bishop (1001-28). Listed in Bern Library catalog in 1760. Probably copy of MS 188. Has Germanicus text, with added scholia in extreme margins. Carefully written and colorfully illuminated, not as well-known as prototype, Leiden *Aratea*. Illustrations imitate Carolingian model. For example, representation of Boötes appears awkward missing the illusionism portrayed in MS Leiden. MS 88 also contains Jupiter on eagle, Helios and Luna missing from MS Leiden.

[525] Eastwood (1983) 25

Miniatures: f.1v Jupiter on eagle; 2v Draco with Ursae; 2v Hercules and Boötes; 3v Gemini, Cancer and Leo; 4v Pleiades and Lyra; 5 Aquarius; 5v Sagittarius; 6v Lepus;10v Helios and Luna; 11v planetary diagram. Many constellations missing.

T **Einsiedeln Stiftsbibliothek Codex 338** (10th c.)

Another of three descendants of MS Leiden *Aratea*, Germanicus text, also includes sections of Avienus. Consists of twenty-two folios; no illustrations or scholia, in abbey library since 14th C.

Germanicus - Group II

LeBoeuffle assigns the following five Germanicus manuscripts to the same family.

T **Basel, Universitätsbibliothek Codex A.N. IV 18** (9th c.)

Made at Fulda, Germanicus text with scholia, Caroline Minuscule script. Has 45 folios with 36 illustrations, also includes other astronomical writings. Thought to be modeled on manuscript dated before 6th C., as discussed in Mütherich, which pictures 4 illustrations. Illustrations sketchily executed in papyrus style between lines of text, no frame. Aquarius and Capricorn pictured close together. Illustrations of constellation cycle show signs of antiquity, similar to MS Leiden *Aratea*. Stars in constellations carefully marked.

Miniatures: Hercules 14v, Serpentarius 16, Boötes 16v, Virgo 18v, Gemini 20, Auriga 22, Taurus 23, Cepheus 24r, Aries 26v, Perseus 28, Cygnus 29v, Aquarius 31v, Sagittarius 32v, Orion 34, Lepus 35v, Eridanus 37, Ara 38,. Some of missing are Jupiter on Eagle, and Pleiades.

Literature: K. Escher, *Die Miniaturen in den Basler Bibliotheken, Museen und Archiven*, Basel (1917) 46; Bischoff, "Katalog I", a.a.O., Nr. 258, S.57; McGurk, *Carolingian Astrological Manuscripts*, (1981) 317-33; Thiele (1898) 138-41; Lehmann, "Die alte Klosterbibliothek Fulda" and "ihre Bedeutung", *Erforschung des Mittelalters*, II, Leipzig (1941) 217; Byvanck, *De platen in de Aratea van Hugo de Groot*, (1949) 213-9; F. Mütherich, "Der Fuldaer Buchmalerei in der Zeit des Hrabanus Maurus", *Studies in Carolingian Manuscript Illumination*, reprint (2004) 153

T **Paris, Bibliothèque nationale de France MS Lat. 7886** (late 9th c.)

Produced at Corbie, Germanicus with scholia, 36 folios, no illustrations, large capital letters, no colored initials. Description of Zodiac begins at 19v. Same lacunae as Basel, Univ. Cod. A.N. IV 18. Incipit: *Ab Iove principium magno deduxit Aratus*.

T **Aberystwyth, National Library of Wales MS 735 C** (11th c.)

Has *Aratea* of Germanicus and *Scholia Basilensia*; illustrated. Contains two parts, first part probably made in Limoges region early eleventh century, second part, in Insular hand of

late eleventh. Descendant of Basel A.N.IV.18 or its exemplar.[526] Text and illustrations studied by P. McGurk, published in *National Library of Wales Journal*. In same journal a few years later, B. Eastwood published full description and analysis of single planetary configuration that appears at beginning of manuscript, folio 4v, is accompanied by verses. Diagram fills upper two-thirds of folio; verses concern seven planets, band of fixed stars written on lower third. Signs of the Zodiac illustrated in outermost ring. Small face representing each planet placed within its circular sphere. Placement of inner rings shows interest in theories of position of orbits of Mercury and Venus, discussed by Martianus Capella and Macrobius. Illustrated with 24 constellations, some joined into one group, also has miniature of 5 planets.

Celestial map of entire sky also included. Iconography of constellations closer to Pseudo-Bede catalog than to any other group of Germanicus' illustrations.[527] Has portrait of Aratus with traditional Muse of astronomy, Urania, found in one other *Aratea* manuscript, Madrid MS 19. Miniature of Jupiter on eagle also included, common in Germanicus, but not Cicero picture cycles. (As expected, since that initial text is absent.) Many variations found in representations of constellations, such as placing Cancer between feet of Gemini instead of on right.[528] Iconography reveals some antique features; i.e, Sagittarius shown as satyr, and representation of aselli on back of Cancer. Folios and images on-line at National Library of Wales website.

Part A:
ff.1-3: historical texts, principal vices, and Priscian
f. 3v: drawing of Southern Hemisphere
f. 4: drawing of Northern Hemisphere
f. 4v: drawing of zodiacal circle wih planets
ff. 5-11: text of Sallust and Macrobius
ff. 9, 11, 25v, 26, 26v blank
Incipit: *Ab Iove principium magno deducit Aratus*.

Miniatures: f.10v planisphere, 11v Aratus and Muse; 12 Jupiter and eagle; 13 Draco and Ursae; 13v Hercules; 14 Corona; 14v Serpentarius on Scorpio; 15 Boötes; 16 Virgo; 17 Gemini with Cancer; 17v Leo; 18 space for Auriga; 18v Taurus; 19 Cepheus; 19v Cassiopeia and Andromeda; 20 Pegasus; 20v Aries; 21 Hydra, Crater, Corvus and Anticanus; 21v five planets; 25 diagram of planisphere with names of constellations.

Part B

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[526] McGurk (1973) 197
[527] McGurk (1973) 198 NLW 735C may have associations with two other manuscripts from the Limoges area, Paris lat. 5543 and Paris lat. 5239. These may have been known to Adémar of Chabannes and used in his copy of Hyginus, Leiden Voss. Oct.lat.15.
[528] McGurk (1975) 5 He calls that 'very curious'.

ff. 17-47: Hyginus, *De astronomia*, not illustrated

Literature: P. McGurk, "Germanici Caesaris Aratea cum Scholiis: A New Illustrated Witness from Wales", *The National Library of Wales Journal XVIII* (1973) 197-216; B. Eastwood, "Notes on the Planetary Configuration in Aberystwyth N.L.W. Ms. 735 C, f 4v", *National Library of Wales Journal*, (1981)129-140

T Madrid, Biblioteca Nacionale MS 19 (also known as A.16) (12th c.)

Compiled at Montecassino using Germanicus' *Aratea* and scholia. Contains 199 ff, and is illustrated with 43 miniatures**.** Manuscript in deteriorated condition, has microfilm, but unreadable. Illustrations in this manuscript, or a copy similar to this one, have been recognized as influential on work of Michael Scot in Sicily.

Illustrations include: 55r Jupiter on eagle, 56r Draco with Ursae, 56r Hercules, 57r Serpentarius, Boötes 57r, Virgo 57v, Gemini 58r, Taurus 59 v, Cepheus 59v, Cassiopeia 60r, Andromeda 60r, Aries 61r, Pisces 61v, Perseus 61v, Pleiades 62r, Lyra 62v, Cygnus 62v, Aquarius 63r, Sagittarius 63v, Orion 64v, Lepus 65v, Ara 67v.

T London, British Library Arundel MS 268 (13th c.)

Germanicus *Aratea* with scholia, written on paper with 103 folios, in small, compressed manner, difficult to read. *Aratea* in first section with other treatises following; written as prose in two columns with glosses on each page. No illustrations or diagrams, nor any spaces left blank to include them. Later in the manuscript, associated with another treatise, spaces are left blank, some circular for illustrations or diagrams that were never completed. It is one of only two *Aratea* surviving from thirteenth century.

Germanicus - Group III

Scholars have reconstructed another group of Germanicus manuscripts, all related to a lost source called B.

T Berlin, Deutsche Staatsbibliothek Codex Phillippicus 1832, lat.130 (late 9th c.)

Made at Metz, fragments of Germanicus with scholia on ff. 86r - 90v. Has illustrations of constellations on beginning folios. Astronomical compendium also includes Bede's *De temporum ratione.*

T Paris, Bibliothèque nationale de France MS Lat. 5239 (10th c.)

Made at Limoges, Germanicus with scholia. Computus charts, calendars, chronicles and consanquinity. Also contains work of Isidore and parts of Bede's *De natura rerum*, *De temporibus* and *De temporum ratione* with many diagrams. Description of constellation preceeds illustration.

ff. 1-215: astronomical texts, T-0 maps, and cosmological diagrams

Miniatures: 215v Draco and Ursae; 216 Hercules and Corona; 216v Serpentarius on Scorpio; 217v Gemini and Cancer; 218 Leo and Auriga; 218v Taurus and Cepheus; 219 Cassiopea; 219v Andromeda and Pegasus; 220 Aries, Triangula and Pisces; 220v Perseus and Lyra; 221 Cygnus and Aquarius; 221v Capricorn and Sagittarius; 222 Aquila and Delphinus; 222v Orion and Sirius; 223 Lepus and Argo; 223v Eridanus and Pisces Magnus; 224 Ara and Centaurus; 224v Hydra, Corvus, Crater and Anticanis.

T **Strassburg, Bibliothéque Universitaire et Regionale 326** (lat.275) (10th c.**)**
Germanicus with scholia. No information available at this time.

Germanicus - Group IV

The following is another group of Germanicus manuscripts that are related to an ancestor that migrated to Montecassino, where it was copied and created much interest.

T **Florence, Biblioteca Medicea Laurenziana Codex Strozzianus 46** (late14th c.)
Made in Florence, Germanicus with scholia based on version in Madrid, Biblioteca Nacionale, MS 19, which was made at Montecassino. Not sure if it is illustrated, its model is. One of only 4 *Aratea* produced in 14th C. Not listed in McGurk, *Astrological Manuscripts in Italian Libraries*.

T **Palermo, Biblioteca Communale, Codex Panormitanus 2Q.q.E.11** (15th c.)
Related to Madrid, Biblioteca Nacionale, MS 19 with Germanicus and scholia, but includes fragments of Cicero as well, is illuminated. Not listed in McGurk, *Astrological Manuscripts in Italian Libraries*.

T **Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Lat. 3110** (15th c.)
Compendium of miscellaneous astronomical treatises made in Florence, fifteenth or possibly late fourteenth century for Coluccio Salutati, canon of Florence. Name of Pope Paul V written in gold in front, name of Cardinal Scipione Borghese at end. Linked to prose descriptions of Hyginus that appear after Germanicus. Line drawings have classical appearance, well-executed with some shading, no borders nor any color added. Miniatures appear after text, often two on page. Text is one-column, written in black, drawings mostly one shade - brown. Stars added in red, usually matching number given in scholia, but placement is random. J.J. Alexander mentions Vat. 3110, "The positions and movements of the figures in the copy of the Hyginus illustrations at NY Public Library almost invariably correspond to similar ones in this manuscript".[529]

ff. 1-42: portions of Hyginus

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[529] Alexander, *The Painted Page*, 120

ff. 42v - 78: *Aratea* of Germanicus, also excerpts of Martianus Capella.
Incipit: *In Iove principium magno deduxit Aratus.*

Miniatures: f. 65 Draco with Ursae; 65v Boötes; 66 Corona; 66v Hercules; 67 Lyra; 67v Cepheus; 68 Cassiopeia; 68v Andromeda; 69 Perseus; 69v Auriga without cart; 70 Serpentarius; 70v Sagitta, Aquila and Delphinus; 71 Pegasus; 71v Aries and Triangula; 72 Taurus and Pleiades; 72v Gemini and Cancer; 73 Leo; 73v Virgo, Libra and Scorpio; 74 Sagittarius and Capricorn; 74v Aquarius; 75 Pisces and Canis Major; 75v Eridanus and Lepus; 76 Orion and Canis; 76v Anticanis and Argo; 77 Centaurus; 77v Ara; 78 Hydra, Corvus, Crater and Southern Fish.

Literature: Saxl and Meier I, 88-90; LeBoeuffle (1975) XL; Viré (1981)159-276; Eastwood (1982)150; Reeve, *Texts and Transmission*, (1986) 21-22; K. Lippincott, "The Astrological Vault of the Camera di Griselda for Roccabianca", in *Journal of the Warburg and Courtauld Institutes*, 48 (1985) 43-70; J.J.G. Alexander (1994) 120; M. Buonocore, *Vedere i Classici*, Fratelli Palombi Editori (1996) 251-53.

Germanicus - Group V

This group of four manuscripts were all made about the same time in the second half of the fifteenth century at the court of Naples; all are fully illustrated but each is just a little different.

T **New York, Morgan Library MS M. 389** (1469)

Italian, Naples, made for Ferdinand I, king of Naples, (d. 1494) or court member. Astronomical anthology: *Aratea* of Germanicus, Pliny the Elder, Hyginus. 117 folios, forty delicately-tinted drawings by Master of Isabelle di Chiaromonte (active 1450–60's in Naples). Similar to Vat. Barb. 76, Barb.77, and Vat.Urb.1358, characteristics of illustrations derived from Carolingian prototype found in Sicily. Light but firm text written by Joan Marco Cinico. Includes planisphere with constellations of northern and southern celestial hemispheres. Discussed fully in Chaper 4.

f. 1-2v: Frontispiece and biography of Aratus.
Incipit: *Aratus quidem fuit. Athinodori patris*
f. 2v-5v: *Scholia Strozziana* with Germanicus *Aratea* excerpts.
f. 6-68: Germanicus, *Aratea* with *Scholia Strozziana*.
Incipit: *Ab Iove principium magno deduxit Aratus carminis*
f. 69v-71: Germanicus excerpts.
f. 71v-77: *Scholia Strozziana* with Germanicus *Aratea* excerpts.
f. 77v -116: Pliny, *Natural History,* Hyginus, and other astronomical texts.

f. 117: colophon

Miniatures: f.3v celestial map, 7 Jupiter on eagle, 11v Draco with Ursae, 14v Hercules, 15v Corona, 16v Ophiucus with serpent standing on Scorpio, 19 Boötes, 20v Virgo, 23v Gemini with Cancer, 27 Leo, 28v Auriga, 31 Taurus, 33 Cepheus, 34v Cassiopeia, 35v Andromeda, 36v Pegasus, 38 Aries, 40 Triangula, 41 Pisces, 42v Perseus, 44 Pleiades, 46 Lyra, 47 Cygnus, 48v Aquarius, 51 Capricorn, 53v Sagittarius, 55v Aquila with Saggita, 57 Delphinus, 59. Orion, f.62 Canis, 64 Lepus, 65v Navis, f.67v Cetus, f.68v, Eridanus, f.70v Pisces Magnus, f.72 Ara, 73v Centaurus, 75 Hydra with Corvus and Crater, 77 Helios in chariot, 83 Luna in cart, 100 another Centaurus.

T Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Barb. Lat. 76
(second-half 15th c.)

Italian, Naples, another manuscript for Ferdinand I, king of Naples, or court member. Owned by Cardinal Barberini. Astronomical anthology: *Aratea* of Germanicus, Pliny the Elder, Hyginus. 100 folios, forty miniatures, illuminated in gold, bold colors, (reds, blues, greens, oranges), compared with softly-colored Morgan MS M 389. Discussed fully in Chapter 4.

f. 1-2v: Biography of Aratus.
f. 2v-5v: *Scholia Strozziana* with Germanicus *Aratea* excerpts.
Incipit: *Coelum circulis quinque distinguitur*.
f. 6-66: Germanicus, *Aratea* with *Scholia Strozziana*.
Incipit: *Ab Iove principium magno deduxit Aratus carminis*
f. 68v-71: Germanicus excerpts.
f. 71v-77: *Scholia Strozziana* with Germanicus *Aratea* excerpts.
f. 77v -85: Pliny, *Natural History* excerpts.
f. 85v-86: *De polis mundi*.
f. 86: Pliny, *Natural History* excerpts.
f. 86-100: Hyginus, *De astronomia* excerpts.

Miniatures: f.3 celestial map, 6 Jupiter, 9v Draco with Ursae, 12 Hercules, 13v Corona, 14v Ophiucus with serpent standing on Scorpio, 16v Boötes, 18 Virgo, 21 Gemini with Cancer, 24 Leo, 25 Auriga, 27 Taurus, 29 Cepheus, 30r Cassiopeia, 31 Andromeda, 32 Pegasus, f.33 Aries, 35 Triangula, 35v Pisces, 37 Perseus, 38v Pleiades, 39v Lyra, 41 Cygnus, 41v Aquarius and Capricorn, 46 Sagittarius with Saggita, 47v Aquila, 48v Delphinus, 49v. Orion, 52v Canis, 55 Lepus, 56 Navis, 57v Cetus, 58, Eridanus, 59v Pisces Magnus, 60v Ara, 61v Centaurus, 63 Hydra with Corvus and Crater, 73v Helios, 77 Luna, 79 another Centaurus (missing Anti-canis or Procyon). Morgan M.389 has the same series of miniatures.

T Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Barb. Lat. 77 (15th c.)

Italian, Naples, for King Ferdinand I or court member. Original owner not identified, arms at bottom of page one, eagle holding baton in beak, motif designed in sixteenth century.

Owned by Cardinal Barberini, second *Aratea* MS in Vatican Barberini Collection. Astronomical anthology with 59 folios: *Aratea* of Germanicus, Pliny the Elder, *Natural History*, extracts of Hyginus, *De astronomia.* Humanistic frontispiece, bordered with white vines on three sides, title inscribed in gold letters. Humanistic script, textual contents identical to Barb. 76. Thirty-nine miniatures, appear before descriptions. Opens with map of celestial sphere, f. 2v.

f. 1-2: Biography of Aratus, title *'Arati fragmentum cum comento incipit'*.
f. 2-4: *Scholia Strozziana* with Germanicus *Aratea* excerpts.
f. 4v-41: Germanicus, *Aratea* with *Scholia Strozziani*.
f. 41v-43: Germanicus extracts.
f. 43-46v: *Scholia Strozziani* with Germanicus *Aratea* excerpts.
Constellation miniatures on folios 2v - 40v, 44v, 47, 52.
f. 47-51v: Pliny, *Natural History* extracts.
f. 51v-52: *De polis mundi*.
f. 52: Pliny, *Natural History* extracts.
f. 52-59v: Hyginus, *De astronomia* extracts.

Miniatures: f.3 celestial map, 4 Jupiter, 5v Draco with Ursae, 7 Hercules, v Corona, 8v Ophiucus with serpent standing on Scorpio, 10v Boötes, 11 Virgo, 13 Gemini with Cancer, f. 14 Leo, 15v Auriga, 17 Taurus, 18 Cepheus, 18v Cassiopeia, 19 Andromeda, 20 Pegasus, f.21 Aries, 22 Triangula, 22v Pisces, 23v Perseus, 24v Pleiades,.25 Lyra,.26 Cygnus, 26v Aquarius and Capricorn, 29 Sagittarius with Saggita, 30 Aquila, 31 Delphinus, 31v. Orion, 33 Canis, f.34v Lepus, 35v Navis, 36v Cetus, 37, Eridanus, 38v Pisces Magnus, 38v Ara,.39v Centaurus, 40v Hydra with Corvus and Crater, 44v Helios, 47 Luna (missing Anti-canis or Procyon).

Literature: Saxl and Meier I, 6-7; M. Buonocore, *Vedere i Classici* (1996) 413; E. Pellegrin, et al, *Manuscrits Classiques Latins de la Bibliothèque Vaticane*, Tome I, Centre National de la Recherche Scientifique (1975) 125-27; J. Martin, *Histoire du texte des Phénomènes d'Aratos*, Paris (1956) 39; T. Silverstein, *Medieval Latin Scientific Writings in the Barberini Collection*, Chicago (1957) 26-27; Viré (1981)173-76.

T Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Urb Lat.1358 (15^{th} c.)

Italian, Naples, fourth of group made for court of Naples. Frontispiece has floral decorations with putti and medallion with insignia of Federico da Montefeltro (1422-82). Also owned by Pope Leo XIII (1878-1903) and Cardinal Giovanni Battista Pitra (1869-1889), their names inscribed in gold. Astronomical anthology with 166 folios: *Aratea* of Germanicus, Pliny the Elder, *Natural History*, extracts of Hyginus, *de Astronomia*. Comparable to Barb. Lat. 76, Barb. Lat. 77, Morgan MS M.389, but more folios and more illustrations. Opens with celestial map, f.3. (Figure B8) Constellation cycle appears on folios 3 - 47v (41 miniatures of *Aratea*) and 123 - 139 (30 miniatures of Hyginus). Miniatures drawn in mono-color reddish-orange with shading, similar coloring to Barb.77, but bolder.

f. 2-2v: Biography of Aratus.
Aratvs sicionius in sicilia noviter repertus incipit feliciter (in red)
f. 2v-4v: *Scholia Strozziana* with Germanicus *Aratea* excerpts
f. 4v-37: Germanicus *Aratea* with *Scholia Strozziani*
f. 37-39: excerpts of Germanicus *Aratea*
f. 39-41 Germanicus with *Scholia Strozziani*
f. 41-47: Pliny, *Natural History* excerpts
f. 47-47v: *De polis mundi*.
f. 47v: Pliny, *Natural History* excerpts
f. 47v-152: Hyginus, *De astronomia*
f. 152-152v: Martianus Capella, *De nuptiis*, excerpts.

Miniatures: f.3 celestial map, 4v Jupiter, 6v Draco with Ursae,8 Hercules, 8v Corona, 14v Ophiucus with serpent standing on Scorpio, 10v Boötes, 11 Virgo, 12v Gemini with Cancer, f 14 Leo, 15 Auriga, 16v Taurus, 17 Cepheus, 17v Cassiopeia, 18 Andromeda, 18v Pegasus, f.19v Aries, 20v Triangula, 21 Pisces, 21v Perseus,22v Pleiades, 23v Lyra, 24 Cygnus, 24v Aquarius and Capricorn, 26v Sagittarius with Saggita, 27v Aquila and Sagitta, 28 Delphinus, 28v. Orion, 30 Canis, 31v Lepus, 32 Navis, 33 Cetus, 33v, Eridanus, 34 Pisces Magnus, 35 Ara, 35v Centaurus, 36v Hydra with Corvus and Crater, 40 Helios, 41 Luna. (missing Anti-canis or Procyon).

Literature: Saxl and Meier I,103-06; M. Buonocore, *Vedere i Classici*, (1996) 414; Viré, (1981) 175-76; *Manuscrits Classiques Latins de la Bibliothèque Vaticane*, Tome II-2, Centre National de la Recherche Scientifique, (1982) 675-77.

Germanicus - Group VI (miscellaneous remainders)

These remaining manuscripts of Germanicus have not been grouped into families, and they are not related, other than containing the text of Germanicus with scholia. They are arranged by century.

T Madrid, Biblioteca Nacionale Codex de Metz 3307 (ca.840)

Anthology of astronomical works composed around 840 at Metz during the tenure of Drogo (823-855) with 76 folios. Compilation was result of gathering of church scholars to attempt reform of computus. This assembly and Charlemagne's role discussed in Chapter 3. Efforts lead to creation of manual, now lost, but reflected in four incomplete copies from 9th century. This is one of surviving copies. Includes Germanicus' *Aratea*. Has one of earliest extant copy of Pliny's text, with apsidal diagram. Origin of this composite, apsidal diagram may date back to Late Antiquity.[530] Contains finest miniatures of the 4 copies, only example with fully-painted figures. Constellation cycle derives from palace exemplar.[531] Figures lack marking of

530 Kühnel 80
531 Mütherich, Carolingian Painting, 89

stars, which are mentioned in text, clearly reflect Late Antique prototypes. This compendium was working manual kept up to date by later entries, recording solar eclipse in 840, another in 876. Full color facsimile published, Madrid, 1993, commentary volume by Manuel Sanchez Mariana.

ff. 1-53: early copy of 'Aix-la-Chapelle encyclopedia', Bede's *De tempore ratione*, computus, astronomical charts and tables.
ff. 54-66: excerpts of *Aratea* of Germanicus with scholia
f. 65v: Pliny's text, with apsidal diagram.
f. 66: planetary diagram
ff. 66v-76: astronomical texts

Illustrations include: f.54v Draco and Ursae; 55 Hercules; 55v Serpentarius with Scorpio; 56 Boötes and Virgo; 56v Gemini and Cancer; 57 Leo and Auriga; 57v Taurus, Cepheus and Cassiopeia; 58 Andromeda and Pegasus; 58v Aries, Triangula, Pisces; 59 Perseus, Lyra and Cygnus; 59v Aquarius and Capricorn; 60 Sagittarius, Aquila and Delphinus; 60v Orion and Canis; 61 Lepus, Argo, Cetus and Delphinus; 61v Eridanus, Pisces Magnus and Ara; 62 Centaurus, Hydra, Corvus and Crater; 62v Corvus and Crater again, Anticanus.

Literature: McGurk (1981) 331; Koehler, *Die karolingische Miniaturen*, vol. 3 Berlin (1960) 100-101, 119-127; Mütherich, *Carolingian Painting* (1976) 89; von Euw, "Die kunstlerische Gestaltung (1993) fig. 23; B. Kühnel, *The End of Time in the Order of Things: Science and Eschatology in Early Medieval Art* (2003) 80: Mariana, *Codex de Metz 3307, Tratado de computo Y Astronomia*, Estudio Critico, Testimonio Compania Editorial, Madrid (1993) facsimile.

T Madrid, Biblioteca Nacionale Codex Matritensis 8282 (15^{th} c.)

Germanicus *Aratea* with commentary, humanistic border on frontispiece with angels, green and gold. Illustrations are unframed, placed between sections of text.
f. 1: title page
ff. 1v-2: biography of Aratus
f. 2v: celestial map, figures all youthful

Miniatures: f.4 Jupiter on eagle, 6v Draco and Ursae; 8 Hercules; 9 Corona; 9v Serpentarius on Scorpio; 11v Boötes; 12 Virgo; 13 Gemini and Cancer; 15v Leo; 16v Auriga; 18 Taurus; 19 Cephus; 19v Cassiopeia; 20v Andromeda; 21 Pegasus; 22 Aries; 23 Triangula; 23v Pisces; 24v Perseus; 25v Pleiades in 2 rows; 26 Lyra; 27 Cygnus; 28 Aquarius and Capricorn; 30 Sagittarius and Sagitta; 31 Aquila; 31v Delphinus; 32v Orion; 34 Canis; 35v Lepus; 36v Argo;

37v Cepheus; 38 Eridanus; 39 Southern Fish; 39v Ara; 41v Centaurus; 42 Hydra, Corvus and Crater; 46v Helios in chariot with 4 horses; 49 Luna in chariot with 2 oxen; 55 another Centaurus.

T **Göttweig, Stiftbibliothek Codex Göttweig 146** (190) (Second-half 14th c.)

Germanicus with scholia, thirty-one folios, not listed with any definite groups. First illustration is celestial globe on pedestal standing within small temple-like structure. This arrangement is similar to BNF Lat.12957 which dates to ninth century. Two different styles of miniatures f.7 to17 has traditional figures, colored drawings; f.18 to 29 has constellations similar to Harley 647 with text filling the bodies of the figures. Has some verses of Germanicus; descriptions are before the illustrations. No stars are indicated on constellations. HMML has microfilm of Göttweig 146, some miniatures are online at HMML website.

ff.1-6v: astronomical texts
Incipit: *Arati et que videntur aste Sionem*.
ff. 32-33v: astronomical texts

Miniatures: f.7 Celestial globe; 7v Ursa Major; 8 Ursa Minor; 8v Draco with Ursae; 9 Hercules; 9v Corona and Serpentarius on Scorpio; 10 Scorpio and Boötes; 10v Virgo holding Libra; 11 Auriga and Taurus; 11v Cepheus; 12 Cassiopeia; 12v Andromeda; 13 Pegasus and Aries; 13v Pisces and Triangula; 14 Perseus; 14v Pleiades; 15 Lyra and Cygnus; 15v Aquarius and Capricorn; 16 Southern Pisces and Ara; 16v Centaurus; 17 Hydra, Corvus, Crater, and Anticanis; 18 Triangula; 18v Pisces; 19 Perseus; 19v Pleiades; 20 Lyra; 20v Cygnus; 21 Aquarius; 21v Capricorn; 22 Sagittarius; 22v Sagitta; 23 Aquila; 23v Delphinus; 24 Orion; 24v Canis; 25 Lepus and Argo; 25v Cetus; 26 Eridanus; 26v Southern Pisces; 27 Centaurus; 28v Hydra, Corvus and Crater; 29 Anticanus; 29v five planets; 31 Helios at top, Luna at bottom.

T **London, British Library Egerton MS 1050** (1480)

Made in Italy (Rome?) as are majority of fifteenth-century *Aratea*, has 125 ff. Purchased from Jos. Lilly, Jan, 1844. Lines of poetry alternate with prose commentary throughout. Constellation cycle pictures 41 miniatures. Frontispiece has humanistic border, scrollwork on three sides, gold trim on edges, first letter A decorated with same scroll, red, blue and green color added. Miniatures all line drawings, tinted with limited palate, red, blue and green. No stars indicated. Each constellation description is marked by large initial in light ink.

ff.1-3: title page, biography of Aratus
ff. 3v-50: Sections of Germanicus' *Aratea* with *Scholia Sangermanensis*.
f. 4: Incipit: *Ab Jove principium magno deduxit Aratus*.
ff. 50 - 64: excerpts from Pliny's *Natural History*, Chapter 18.
ff. 55v-125v: excerpts of Hyginus' *De astronomia*, no illustrations or diagrams.

Miniatures: f. 3v Jupiter on Eagle; 6 Draco and Ursae; 7v Hercules; 8v Corona; 9

Serpentarius on Scorpio; 10v Boötes; 11v Virgo; 13 Gemini and Cancer; 15 Leo; 16 Auriga; 17v Taurus; 18v Cepheus; 19v Cassiopeia; 20 Andromeda; 20v Pegasus; 21v Aries; 22v Triangula; 23 Pisces; 24 Perseus; 25 Pleiades; 26 Lyra; 26v Cygnus; 28v Aries; 30 Sagittarius and Sagitta; 31v Aquila and Sagitta; 32 Delphinus, 33 Orion; 35 Canis; 36v Lepus; 37v Argo; 38v Cetus; 30 Eridanus; 40v Pisces Magnus; 41 Ara; 41v Centaurus; 42v Hydra, Corvus and Crater; 43v Helios; 47 Luna; 55 another Centaurus.

Literature: Saxl and Meier III, 140; *Catalogue of additions to the Mss. in the BM.*, 1841-1845 (London 1850) 152.

T **Vienna, Schottenkloster Codex Scotensis Vindobonensis 545 (521)** (15th c.)

Germanicus *Aratea* with scholia, text has many large foliated initials, alternate red and blue. Has 90 folios and 40 well done illustrations, based on two different models, two or three to a page. Beginning on f.18 illustrations change from fully colored images to Harley 647 style with text making up the body of constellation. Five planets shown as heads in v-shaped sections surrounded with text, similar to Harley 647. HMML has microfilm, can be viewed on line at Vivarium.

T Florence, Biblioteca Medicea Laurenziana Cod. Laur. Plut. 89 sup. 43 (15th c.)

Humanistic manuscript, probably made in Florence, second-half fifteenth century, 171 ff; produced for Guardaroba Medicea. Medici arms inscribed on f. 3.. Fully illustrated with 43 constellations, first miniature is Jupiter on Eagle, Sun and Moon are on separate folios at end. Excerpts of Pliny and Hyginus follow *Aratea,* Hyginus text is fully illustrated also.

ff. 1-2: blank

f. 2v: frontispiece

ff. 3-4: life of Aratus

Incipit: *Incipit liber arati de signis celestibus*

ff.4-6: excerpts from *Scholia Sangermanensia*

Incipit: *Ab Iove principium magno*

ff. 6v-54v: Germanicus' *Aratea* with scholia

ff. 55-169: excerpts of Pliny's *Natural History*, Hyginus with another constellation picture series.

Miniatures: f. 4v Celestial sphere; 6v Jupiter on Eagle; 9 Draco with Ursae; 11 Hercules; 11v Corona; 12v Serpentarius on Scorpio, 14v Boötes; 15 Virgo; 17 Gemini and Cancer; 19 Leo; 20 Auriga; 22 Taurus; 23 Cepheus; 23v Cassiopeia; 24v Andromeda; 25 Pegasus; 26 Aries; 27v Triangula; 28 Pisces; 29 Perseus; 30 Pleiades; 31 Lyra; 32 Cygnus; 32v Aquarius and Capricorn; 35v Sagittarius; 36v Aquila and Sagitta; 37v Delphinus; 37 bis Orion; 39 Canis; 41 Lepus; 42 Argo; 43 Cetus; 43v Eridanus; 44v Pisces Magnus; 45v Ara; 46v Centaurus; 47v Hydra, Corvus and Crater; 52 Helios; 55 Luna.

Literature: McGurk, *Astrological Manuscripts in Italian Libraries* (1966) 26-29;

C.Leonardi, "Icodici di Marziano Capella", *Aevum*, 34 (1960) 45-46.

T London, British Library Additional MS 15819 (1470)

Germanicus *Aratea* fragments (verses 1- 430) with scholia, made in Italy, contains 71 ff, fine quality vellum, very thin and white. Text in one column only. Frontispiece similar to BL Egerton 1050, humanistic border on 3 sides, scroll work outlined in blue. Has illustrations of 38 constellations, several folios have 2 constellations on same leaf. Prose commentary and poetry alternation continues throughout, similar to Egerton 1050. Constellation miniatures drawn before text descriptions. Also Pliny's *Natural History* XVIII, and Hyginus' *De astronomia*. Purchased from Jechener, Paris May 1846.

ff. 1v-2: Prose text with spaces left for images, but not drawn.
Incipit: *Arathi fragmentvm cvm commento noviter repertvm in sicilia incipit*
ff. 2-4: excerpts *Scholia Sangermanensia*.
f. 3: celestial map with faint color added to constellation figures.
ff. 4v-55v: *Aratea* of Germanicus with Scholia Sangermanensia
Incipit *Ab Jove principium magno deduxit Aratus*,
ff. 55v-71: excerpts of Pliny's *Natural History* and Hyginus' *De astronomia*

Miniatures: f. 4v Jupiter on Eagle; 6 Draco with Ursae; 8 Hercules; 9 Corona; 9v Serpentarius on Scorpio, 11v Boötes; 12 Virgo; 14 Gemini; 16 Leo; 17v Auriga; 19 Taurus; 20v Cepheus; 21v Cassiopeia; 22 Andromeda; 23 Pegasus; 24 Aries; 25v Triangula; 26 Pisces; 28 Perseus; 29 Lyra; 30 Cygnus; 30v Aquarius and Capricorn; 33v Sagittarius; 35 Aquila; 35v Southern Pisces; 36v Orion; 39 Canis; 41 Lepus; 42 Argo; 43 Cetus; 43v Eridanus; 45 Pisces Magnus; 48 Hydra, Corvus and Crater; f.49 space left for picture but none drawn; 52v Helios; 55v Luna (unfinished); 62 Centaurus.

Literature: Saxl and Meier III, 51-53; *Catalogue of additions to the mss. in the B.M.* 1846-47, London (1864)

T Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Urb Lat.1653 (15^{th} c.)

Belonged to library of Dukes of Urbino, noted for outstanding illuminated manuscripts. Acquired for Vatican Library by Pope Alexander VII in 1658. Illustrated ? Not included in *Vedere i Classici*, no microfilm at St Louis University Library.

T **Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Reg. Lat 1801** (15^{th} c.)

Excerpts of *Aratea* of Germanicus, commentary and biography of Aratus. Not illustrated. Astronomical manuscript not included in *Vedere i Classici*, no microfilm at St Louis U. Library.

T Naples, Biblioteca Nazionale MS XIV. D. 37 (third-quarter 15^{th} c.)

Made in southern Italy, humanistic cursive, has 55 ff. Begins with life of Aratus, continues with Germanicus' *Aratea* in verse with sections of *Scholia Sangermanensia*. Colored

miniatures start on folio 3v; 36 constellations are illustrated, also Jupiter on eagle, Sol in chariot, Luna in cart. Pliny and Hyginus included but not illustrated.

ff. 1-1v: Life of Aratus
ff.1v-3v: excerpts from *Scholia Sangermanensia*
ff. 4-43: A*ratea* of Germanicus (verses 1-430) and scholis
ff. 43-55: excerpts from Hyginus and Pliny's *Natural History*

Miniatures: f.2v celestial map, 3v Jupiter; 6 Draco with Ursae; 7v Hercules; 8v Corona; 9 Ophiucus with serpent standing on Scorpio; 10v Boötes; 12v Leo; 13v Auriga;.14v Cepheus; 16v Cassiopeia; 17 Andromeda; 18 Pegasus; 18v Aries; 19v Triangula; 20 Pisces; 21 Perseus; 22 Pleiades; 22v Lyra; 23v Cygnus; 24 Aquarius and Capricorn; 26v Sagittarius with Saggita; 29v Canis; 31 Lepus; 32 Navis; 32v Cetus; 33 Eridanus; 34v Pisces Magnus; 35 Ara; 35v Centaurus; 36v Hydra with Corvus and Crater; 40v Helios and chariot; 44 Luna and chariot.

Literature: P.McGurk, *Astrological Manuscripts in Italian Libraries* (1966) 62-63.

T **Berlin, Deutsche Staatsbibliothek Lat. Oct. 149** (15^{th} c.)
No information available on this *Aratea* manuscript other than it has Germanicus text.

T **Paris, Bibliothèque nationale de France Lat. 7887** (10^{th} c.?)
Germanicus *Aratea* fragments, life of Aratus, commentaries, 60 folios, no illustrations, bound with works of Bede.

Manuscripts With Cicero Text

Earliest surviving manuscript with text of Cicero, BL MS. Harley 647, produced in Lotharingia area. Arrived in England by middle of tenth century. In English centers, many later manuscripts modeled on Harley 647, but no exact copies. Additions attached to text, and constellation cycle was enlarged to include more images. It appears that only Cicero's version of *Aratea* circulated in medieval England, unless the Germanicus at Aberystwyth arrived there in Middle Ages, which McGurk doubts. Three Germanicus *Aratea* currently in England arrived there much later, as collector's items. Illustrations of constellations in Cicero manuscripts often begin with Sign of Aries, rather than with usual group of Draco and Ursae, as this is where his

surviving text begins. By twelfth century, this changes. Because Harley 647 was missing descriptions of numerous constellations, some copies supplemented the lacunae with other sources, adding constellation myths that did not appear in exemplar. Along with additional text, missing images were inserted to compliment stories.

By tenth century, classical representations of ancient Greco-Roman world had been imported to England, by way of constellations in *Aratea* manuscripts. Miniatures were copied in English monasteries until twelfth century with various alterations and innovations. Two of these are discussed in section 4.5. After twelfth century, it seems that no more copies of the *Aratea* in Harley mode were made, at least none survive. At that time astronomical interest was attracted by 'new', exotic astrological and Arabic writings which had entered Anglo-Saxon world.[532] Thirteen extant illustrated manuscripts have fragments of Cicero's poem or Cicero recension. Seven now in England; six housed in other European libraries. Four surviving Cicero manuscripts are in British Library: Harley 647; Harley 2506; Cotton Tiberius B.V; and Cotton Tiberius C.I; two at Oxford: Bodley 614 and Digby 83; and one at Cambridge, Trinity College, MS R.15.32.

T **London, British Library Harley MS 647** (9th c.)

Carolingian manuscript, 21 folios, discussed in Chapter 4, information will not be repeated. Like MS Leiden *Aratea,* Harley 647 was modeled on unknown Late Antique prototype, probably from fourth or fifth century. Though incomplete, has one of the most 'pure' texts of Cicero's *Aratea,* much scholia was added to later versions.

ff. 1-16v: excerpts of Cicero's *Aratea* and illustrations.

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[532] Saxl ("Illuminated Science Manuscripts") 110 "The illuminated astronomical manuscripts of the tenth, eleventh and twelfth centuries, do not record any scientific discoveries by English monks. Their work was based entirely on the classical heritage. English manuscripts differ from the Continental ones of the same period in one essential point. The English manuscripts except for two exceptions are based on one classical original".

Incipit: *E quibus hinc subter possis cognoscere fultum.*
ff. 16v-21v: Pliny's *Natural History*, Macrobius, Martianus Capella, and Macrobius.

Miniatures: f. 2v Aries; 3 Triangula; 3v Pisces; 4 Perseus; 4v Pleiades; 5 Lyra; 5v Cygnus; 6 Sagittarius; 6v Sagitta; 7 Aquila with Sagitta; 7v Dephinus; 8 Orion; 8v Canis; 9 Lepus; 9v Argo; 10 Cetus; 10v Eridanus; 11 Pisces; 11v Ara; 12 Centaurus; 12v Hydra with Crater and Corvus; 13 Anticanis; 13v five planets.

The following manuscripts are five other representatives of this family of Cicero texts.

T **London, British Library Cotton MS Tiberius B. V**. (995-1016)

Large volume of miscellaneous works, 87 ff. In possession of Battle Abbey by 1100, material added there. In possession of Sir Robert Cotton by 1621.[533] Often called close copy of Harley 647, but really not comparable. Astronomical text is similar, but arrangement and artwork is quite different. Probably copied from Winchester exemplar, at Winchester or possibly Christ Church. Unlike Harley 647, which includes no other texts, Cicero text is small segment, bound with works of Priscianus, Pliny, Bede, Macrobius, Martianus Capella, and short Anglo-Saxon tracts. Presumably composed before 1016, since in list of West-Saxon kings, total number of years of Aethelred's reign not filled in; he died in 1016. That fact and other evidence proposes date early in eleventh century. Scribe included two sets of descriptions for each constellation, like Harley 647. Verses written in dark brown at bottom of page, first letter set off and larger. First letter of each paragraph of Hyginus scholia is much enlarged, but text has been removed from within figures to above.

Has three different picture cycles: calendar with Labors of Months; *Marvels of the East* with griffins and dog-headed people; and partial constellation cycle (26 only) of *Aratea*, missing first sections of constellations. Calendar has miniatures with Labors of Months at top of each page; medallions with Signs of Zodiac are placed at bottom. Originally had three maps: world map, celestial map, (now lost) and Macrobian-style zonal map. Has miniature of Sun and Moon that does not appear in Harley 647. Drawings quite large, filling between half and three-quarters of page, not framed; sometimes overlap into text, which is arranged around artwork, with one constellation per page. Colors include dull blue, orange, brown, and some green. Figures have firmness and solidity characteristic of English drawings. Male figures fully dressed with identifying emblems. Garments do not retain antique elements, instead are 'modernized' with proper Romanesque ruffled edges and V-folds. In classical representations, Perseus and Aquarius mostly naked, Orion in backward pose. Orion removed from heavens, stands under pediment supported by four columns. Innovations show constellations were not directly copied from Harley 647, artists or patrons were not interested in reproducing antique art forms. Stars are soft-red dots, still aligned along perimeter of figures, not accurately placed. Five planets shown as

[533] Catalog of Dated Manuscripts 106

heads, encircled, and designed in diamond format, each bound with knotted frame. Has been analyzed under direction of Patrick McGurk, who produced facsimile edition.

f. 1: three *rotae*
ff. 1v-19: Calendar and computus
f. 22: list of West-Saxon kings
ff. 32v- 49v: large fragment of Cicero's *Aratea* with scholia.
Incipit: *A quibus hinc subter possis cognoscere fultum*.
ff. 49-87v: excerpts of Priscianus, Pliny, Bede, Macrobius, and Martianus Capella

Miniatures: f. 32v Aries; 33 Triangula; 33v Pisces; 34 Perseus; 34v Pleiades; 35 Lyra; 35v Cygnus; 36 Aquarius; 36v Capricorn; 37 Sagittarius; 37v Sagitta; 38 Aquila; 38v Delphinus; 39 Orion; 39v Sirius; 40 Lepus; 40v Argo; 41 Cetus; 41v Eridanus; 42 Pisces Magnus; 42v Ara; 43 Centaurus; 43v Hydra, Crater and Corvus, 44 Anticanus; 44v five Planets; 47 Helios top, Luna bottom.

Literature: Saxl and Meier III, 119-128; Ker, *Catalogue Anglo-Saxon MSS*, no. 193; R.I. Page, "Anglo-Saxon Episcopal Lists III", *Nottingham Mediaeval Studies* X (1966) 2-24; Temple, *Anglo-Saxon MSS: 900 - 1066*, no. 87, 104; J.C. Webster (1938) 53-56; Dodwell, *Canterbury School*, 18; Saxl, "Illustrated Science Manuscripts in England", 103; Weitzmann, *Ancient Book Illumination*, 18; Watson, *Catalogue of Dated and Datable Manuscripts*, p.106-7; Köhler and Mütherich, *Die karolingischen Miniaturen*, vol. 4, p.101; McGurk, P. et al. *An Eleventh-Century Anglo-Saxon Illustrated Miscellany: British Library Cotton Tiberius B.V. Part 1, Together with Leaves from BL Cotton Nero D. II, Early English Manuscripts in Facsimile*, XXI. Copenhagen: Rosenkilde & Bagger (1983)

T **London, British Library Harley MS 2506** (ca.1000)

Produced about same time as Tiberius B.V, 93 ff. Not made in England, but at Benedictine monastery of Fleury on river Loire. English monastery of Ramsey was aligned with Fleury in late 10th c. Abbo of Fleury went to England to teach, was school-master in 986-8. Abbo was interested in mathematics and astronomy, wrote four short astronomical treatises for students. At that time, important astronomical and computistical manuscripts were brought from Fleury to England, and actively copied. Corrections in Harley 647 had been wrongly attributed to Abbo. Harley 2506 may have reached England through these monastic relationships.

Minatures in Harley 2506 painted by English artist, who perhaps worked in France, 'the Ramsey master'. His expert painting is seen in other manuscripts, talented in both tinted line drawings and fully-colored illuminations. Some of his work was apparently produced on continent, which implies that he traveled between monasteries of England and Europe.[534] Saxl

[534] Backhouse 24

too compliments this artist, “one of the best draughtsmen of the end of the tenth century, who belongs to the so-called Winchester school applied his gifts to the illustration of Cicero text”.[535] Saxl adds, “there is nothing more beautiful in mediaeval illustration of the constellations than the work of this artist”.[536]

Verses of Cicero’s *Aratea* are written on one side of folio in brown, scholia of Hyginus on other side in red. Text is same as Harley 647, but commentaries, written in margins are different. Has 43 constellations pictured, higher total reflects sections of Hyginus that have been added to fill in 16 constellations before Aries. Line drawings use color wash with delicate shading, drawings are outlined in brown ink, touches of red and blue wash. Ramsey master takes liberties with drawings, showing creative talent. Miniature of Sagittarius is unusual, since artist has chosen older type for this zodiacal sign. Sagittarius more often depicted with full horse body and human from waist up. Here Sagittarius is winged satyr with just two animal legs, artist humorously positions two stars on his private parts. Face of Aquarius is more stern, his hair becomes wings, both figures not usually shown with wings. Depictions of males are mostly nude with delicate facial features in profile. Stars are large red dots, generously distributed, but randomly placed.

ff. 1-30: Hyginus’ *De astronomia*
ff. 30-35v: excerpts of Priscian, Abbo of Fleury, and religious texts.
ff. 36r-48v: fragments of Cicero’s *Aratea* with scholia and illustrations
Incipit: *A quibus hinc subter possis cognoscere fultum*.
ff. 49-93v: excerpts of Pliny the Elder, Macrobius, and Martianus Capella.

Miniatures: f.36 Aries; 36v Triangula and Pisces; 37 Perseus; 37v Pleiades; 38 Lyra and Cygnus; 38v Aquarius; 40v Delphinus; 41 Orion and Canis; 41v Lepus; 42 Argo and Cetus; 42v Eridanus; 43 Pisces Magnus; 43v Ara; 44 Centaurus, Hydra, Corvus and Crater; 44v Anticanis; 45 planets.

Literature: Saxl and Meier III, 157-60; C. Niver, “The Psalter in the British Museum, Harley 2904", *Medieval Studies in Memory of A. Kingsley Porter* (1939) 44-9; Saxl and Wittkower, “British Art and the Mediterranean” (1948) 37; Saxl, “Illustrated Science Manuscripts in England” (1957) 102-8; F.Wormald, *English Drawings of the Tenth and Eleventh Centuries*, London (1952) 32-3; Temple, *Anglo-Saxon Manuscripts, 900-1066* (1976) 65; J. Backhouse (1997) 24; D.H. Turner, L.E.Webster, eds. *The Golden Age of Anglo-Saxon Art 966-1066* (1984) 120; L. Grodecki, *Le siècle de l’An Mil*. (1973) 242.

[535] Saxl “Illustrated Science Manuscripts in England” 102
[536] Saxl “Illustrated Science Manuscripts in England” 102

T **Cambridge, Trinity College MS R. 15. 32** (ca.1000)

Probably created at New Minster, Winchester in late 10th or early 11th century. Third manuscript of Cicero's *Aratea* produced around the year 1000. Astronomical anthology compiled in England along with Hyginus' *De astronomia* and Abbo of Fleury's treatises on astronomy. Contains 110 ff, written in two columns using minuscule of eleventh century. Illustrated, but not listed in Saxl and Meier.

T **London, British Library Cotton MS Tiberius C. 1**. (ca.1122)

Probably originated at Peterborough, England in 1122, illustrated, 42 ff, discussed in detail in Chapter 4. Cottonian and Harleian libraries were rich source of *Aratea* manuscripts. Robert and Edward Harley, 1st and 2nd Earls of Oxford, and Sir Robert Cotton, were great collectors. Both libraries held two copies of Cicero's *Aratea*. Sir Robert, the elder Harley (1661-1724), Queen Anne's minister, began to collect books when he succeeded to family estate in 1700, until 1711, when son Edward (1689-1741) took over. Harley collected many books from English monasteries.

ff. 2-20: excerpts of Macrobius, Isidore, Pseudo-Bede, calendar tables and ecclesiastical rotae.

ff. 21-34: *Aratea* of Cicero and scholia

ff. 36-42v: excerpts of Pliny's Natural History, Martianus Capella, and Macrobius.

Incipit: *E quibus hinc subter possis cognoscere fultum.*

Miniatures: f. 21 Aries; 21v Triangula; 22 Pisces; 22v Perseus; 23 Pleiades; 23v Lyra; 24 Cygnus; 24v Aquarius; 25 Capricorn; 25v Sagittarius; 26 Sagitta; 26v Aquila and Sagitta; 27 Delphinus; 27v Orion; 28 Canis; 28v Lepus; 29 Argo; 29v Cetus; 30 Eridanus; 30v Pisces Magnus; 31 Ara; 31v Centaurus; 32 Hydra with Crater and Corvus; 32v Anticanus; 33 five planets; 33v Helios and Luna.

T Leiden, Rijksuniversiteitsbibliotheck Voss. Lat. f.121 (11th- 12th c.)

Last of this family of Cicero's *Aratea*. Derives from a lost copy of Harley 647, but is incomplete. Illustrated?

The following manuscripts belong to a second group of Cicero's *Aratea* texts.

T Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Reg. Lat 1324 (15th c.)

Contains fragments of Cicero's *Aratea* with fragments of Germanicus. Illustrations have no frame, no stars pictured, writing is very small. Microfilm at St Louis University, not listed in *Vedere i Classici*. A small illustration of Boötes with one arm turned into a wing appears in McGurk, *Astrological Manuscripts in Italian Libraries*, p.87.

Miniatures: f.27 Celestial globe in temple-like structure; 27v Ursa Major and Minor; 28 Draco and Ursae; 28v Serpentarius on Scorpio, Boötes, Virgo and Gemini; 29 Cancer, Leo, Auriga and Taurus; 29v Cepheus, Cassiopeia and Andromeda; 30 Pegasus, Aries, Triangula,

Pisces and Perseus; 30v Pleiades, Lyra and Cygnus; 31 Aquarius, Capricorn, Sagittarius, Sagitta, Aquila and Delphinus; 31v Orion, Canis, Lepus and Argo; 32 Anticanis, Eridanus, Pisces Magnus and Ara; 32v Centaurus, Hydra, Corvus and Crater; 33v five planets.

T **Milan, Biblioteca Ambrosiana, Codex Ambrosiana D. 52 inf.** (15th c.)

Contains fragments of Cicero's *Aratea* with sections of Germanicus and Avienus. Includes illustrations, not listed in McGurk, *Astrological Manuscripts in Italian Libraries*.

T Monpellier, Bibliothéque interuniversitaire, Faculté de medicine, MS H. 452 (15th c.)

Germanicus and Hyginus appear first, then Cicero fragments, paper, 173 ff. with 34 illustrations. Descriptive text is preceded by illustration. Also Hyginus' *De astronomia*.

ff. 1-7: text and unfinished diagram.

Miniatures: f.7v Draco and Ursae; 10 Hercules; 11 Corona; 12 Serpentarius; 13v Boötes; 16 Virgo; 17 Gemini; 19v Leo; 21 Auriga; 22v Taurus; 24 Cepheus; 25 Cassiopeia; 25v Andromeda; 27 Pegasus; 28 Aries and Triangula; 30 Pisces; 31 Perseus; 32v Pleiades; 33 Lyra; 34 Cygnus; 35 Aquarius; 38 Sagittarius; 40v Delphinus; 41 Sagittarius shooting Scorpio; 43v Capricorn; 45v Lepis; 46v Argo; 48v Eridanus; 50 Southern Fish; 52 Centaurus; 53 Hydra, Corvus and Crater; 57 Helios; 59 Luna.

T **Siena, Biblioteca Comunale Degli Intronati, L.IV. 25** (14th c.)

Italian, late 14th century, written in Gothic minuscule, 172 ff. Includes *Scholia Sangermanensia*, *revised Aratus Latinus* and several fragments of Cicero. Only 27 constellations represented, starting with Hercules. Only manuscript containing *Scholia Sangermanensia* with illustrations to survive between ninth-tenth century (4) and fifteenth century (2). Cited in McGurk, *Astrological Manuscripts in Italian Libraries* p.82; miniature of Boötes with his arm covered by an animal skin shown on p.88.

The following manuscripts are Cicero *Aratea* manuscripts that are not a part of the families established by Soubiran.

T **Oxford, Bodleian Library MS Bodl. 614** (ca.1120-40)

Aratea of Cicero, made in England, 51 folios, 20 illustrations, also contains Germanicus scholia.

Astronomical illustrations of both Bodl. 614 and Digby 83 go back to model related to Cotton Tiberius B.V. These two also differ from Harley 647 and Tiberius B.V. tradition of a more 'pure' text. In Bodl.614, text and illustrations have been supplemented with material from Hyginus' *De astronomia*. Bodl. 614 covered in more detail in Chapter 4.

ff. 1-14: calendar, computus tables
ff. 18-22: Signs of Zodiac
ff. 22-42: Cicero's *Aratea* with *Scholia Sangermanensia*

Incipit: *Sciendum itaque est Deum in ipso firmam(ento) XII domicilia*.

Miniatures: f.18 Aries; 18v Taurus; 19 Gemini and Cancer; 19v Leo; 20 Virgo, Libra held by Scorpio; 20v Sagittarius; 21 Capricorn; 21v Aquarius; 22 Pisces; 23 planets with Sun and Moon in medallions; 24 Draco, Ursae, Boötes, Corona; 24 Hercules/Engonasin; 25 Lyra and Cygnus; 25v Cepheus; 26 Cassiopeia; 26v Andromeda and Perseus; 27 Pleiades; 27v Hyades; 28 Serpentarius; 28v Auriga; 29 Sagitta and Aquila; 29v Delphinus; 30 Pegasus, 30v Triangula; 31 Orion; 31v Lepus and Canis; 32 Anticanis and Argo; 32v Eridanus; 33 Centaurus; 33v Cetus and Pisces Australis; 42 Sun; 42v wind diagram; 43 rainbow; 43v man holding astrolabe.

T **Oxford, Bodleian Library Digby MS 83** (last quarter 12th c.)

Produced near Winchester, another copy of Cotton MS. Tiberius B.V. Astronomical compilation has fragments from Cicero's *Aratea*, also excerpts from Hyginus with scholia and Isidore's *Etymology*. 76 folios, decorated with 38 illustrations.

ff. 1-76v: astronomical texts including *Aratea* of Cicero, *Scholia Strozziana*, Hyginus
ff. 2v-4v: cosmological diagrams
Incipit: *Duo igitur sunt extremi vertices mundi*

Miniatures: f.44 Draco, Ursae and Boötes; 44v Virgo and Corona; 45 Hercules; 45v Lyra; 46 Cygnus; 46v Cepheus; 47 Cassiopeia; 47v Andromeda; 48 Perseus; 48v Pleiades and Hyades; 49v Serpentarius; 50v Auriga and Sagitta; 51 Aquila; 51v Delphinus; 52 Pegasus; 52v Triangula; 53 Aries; 53v Taurus; 54 Gemini; 54v Cancer; 55 Leo; 55v Virgo; 56 Scorpio with Libra; 57 Sagittarius; 57v Capricorn; 58 Aquarius; 58v Pisces; 62 Orion; 62v Lepus; 63 Canis; 63v Anticanis; 64 Argo; 64v Eridanus; 65 Centaurus; 65v Cetus; 66 Pisces Magnus; 66v Ara; 67 Hydra, Corvus and Crater.

Literature: Saxl and Meier III, 345-46.

T **Göttweig, Stiftsbibliothek Codex Göttweig 7 Bl. 20** (15th c.)

Made at Koster Gottweig, modeled on Cicero's Harley 647. One of few manuscripts that retains Hyginus scholia written inside illustrations of constellation figures. Text written in prose form. Illustrations have no color added, but nicely modeled.

Manuscripts with Avienus Text

Manuscript tradition of extensive translation composed by Avienus is simplest of three Latin poets, as there are only a few surviving manuscripts. The *Aratea* of Avienus has no associated scholia and usually not illustrated. The oldest extant Avienus manuscript, Vienna, Osterreichische Nationalbibliotek, Codex Vindobonensis Pal.107, is dated to the ninth century,

probably copied from an earlier insular source.[537] The Vienna compendium contains the major part of poem, lines 1-1581. Another manuscript of Avienus' *Aratea* is found in Wolfenbüttel, Codex Gudianus 132, from tenth century, probably made in Corvey. The only other extant manuscript of Avienus' version is Milan, Ambrosiana D.52 inf., which was produced in the fifteenth century, sometime before 1477 by Milanese scholar Boninus Mombritius. This manuscript is not only a copy of Vienna 107, 'but a direct copy'. It is illustrated, also contains some text of Germanicus and Cicero. Milan manuscript adds lines 1750 to the end, also includes parts of his *Orbis terrae*. Edition published in Venice in 1488 which printed whole poem of Avienus. This volume also contains Latin versions of Cicero and Germanicus.[538]

T **Vienna, Osterreichische Nationalbibliotek Cod. Vind. Pal. 107** (9^{th} c.)
Poem of Avienus on folios 1-8v, but not illustrated, microfilm at HMML.

T **Wolfenbüttel, Herzog Augustbibliothek Codex Gudianus 132** (10^{th} c.)
Made at Corvey, text is Avienus' *Aratea*, not illustrated.

T **Milan, Biblioteca Ambrosiana Codex Ambrosiana D.52 inf.** (15^{th} c.)
Aratea of Avienus, also includes text of Germanicus and Cicero, includes illustrations.

Listed twice, also with Cicero texts above.

Manuscripts with *REVISED ARATUS LATINUS*

The *revised Aratus Latinus,* also called *Aratus Latinus recensio interpolata,* was explained in Chapter 4, a compressed version of Aratus' *Phaenomena* translated from Greek in the Middle Ages. There are three different types of constellation picture cycles that appear in

537 Reeve 19
538 Reeve 19

various *revised Aratus Latinus* manuscripts. There is one variety of miniatures in Cologne, Dom.Cod. 83 II. The second variation appears in Paris BNF, MS. Nouv.acq. Lat. 1614. A third different style is found in Dreseden MS. Dc.183; Paris, BNF, MS. Lat. 12957; St Gall, MS 920 and St Gall MS 250. The last four codices are closely related to each other. McGurk has studied these manuscripts in relation to their illuminations. He states, "It is likely that the *revised Aratus Latinus*, which was a revision of the unillustrated *Aratus Latinus*, borrowed its cycles of illustrations from elsewhere. Such borrowings might explain both the variations in the cycles and the misunderstandings and inaccuracies in the illustrations themselves".[539]

T Cologne, Dombibliothek Cod. 83 II (ca. 805)

Miscellany compiled in Cologne, contains *Aratea* with works of Isidore and Bede's *De temporum ratione*, almost complete. Also has short treatises of various astronomical and computistical texts compiled from usual authors, giving impression that it was unified book. Displays uniform page layout, similar rubrication and quire signatures written by hands responsible for copying texts. Has one of first copies of Calendar of Lorsch, compiled in 789, also works by religious authors, such as St Jerome. Aratean text is exceptionally corrupt version of *revised Aratus Latinus*.[540] Earliest known example of *Aratea* with Germanicus prose scholia or *revised Aratus Latinus*, and most beautiful of *revised Aratus Latinus* group. Not all constellations illustrated, images large, inserted between text with no frames.

Literature: Anton von Euw, "Die künstlerische Gestaltung", *Science in Western and Eastern Civilization in Carolingian Times*, (1993) 251-272 and *Die Kolner Dombibliothek*, Munchen, (1998) Nr. 29, S. 136-156; L.W. Jones, *The Script of Cologne from Hildebald to Hermann*, (1932) 23; Thiele, *Antike Himmelsbilder*, (1898) 157; C. Heusgen, "die komputistische Handschrift der Kölner Dombibliothek", *Colonia Sacra*, 1 (1947)11-18.

T Paris, Bibliothèque nationale de France Nouv. Acq. lat. 1614 (early 9th c.)

Miscellany compiled at Cologne or possibly Tours region. Part of dismembered Tours Public Library manuscript and has *revised Aratus Latinus*. Also extracts from '810 compilation', and report of 809 computistical colloquium. Contains cycle of constellation images, ff.146-171v, which are dissimilar to Cologne, MS 83, and page layout in constellation series different than most other *Aratea*. Folios divided almost in half from top to bottom, text written in one column.

539 McGurk (1981) 320
540 McGurk (1981) 319

Illustrations run together, one below the other, no frame, no identifying label, or other manner of separating each image. Drawings crudely executed, bodily representations poorly done, proportions inaccurate. Includes writings of Isidore and Bede's *De temporum ratione.*

T **Dresden, Sächsische Landesbibliothek Dc.183** (early 9th c.)

Has *revised Aratus Latinus* and fragments of Cicero with Hyginus scholia. Based on Harley 647 or its archetype, completely destroyed during WWII. Was illustrated, compiled with other astronomical texts.

Literature: Bischoff, *Katalog der festlandischen Handschriften des Jahrhunderts* (mit Ausnahme der wisigotischen) I. Wiesbaden (1998) Nr. 1044, S. 225; Mütherich, "Book Illumination in the Court of Louis the Pious" (2004)107 ; A. Byvanck, *De platen in de Aratea van Hugo* de *Groot*, Afd. Letterkunde, Nieuwe Reeks, Deel 12, no. 2 (1949) 213-19.

T Paris, Bibliothèque nationale de France MS latin 12957 (9th c.)

In delicate condition, compiled at St-Martin de Tours, 100 ff. Contains *revised Aratus Latinus* and fragments of Germanicus, ff. 57-74v. Text written in one column with 33 lines, brown ink, names of constellations in red. Forty-three constellations pictured. First image is celestial diagram with two spheres, depicts band of Zodiac, top sphere begins with Libra, lower one begins with Aries. Next miniature is outstanding illustration of detailed celestial globe on pedestal within temple-like structure, seen in other Aratean manuscripts. Authentic globe even has 'handle' on top to turn it. Folio 71v shows miniature of five planets as encircled busts. Illustrations of Helios and Luna have same iconographical features found in many Aratean codices. On same folio, Sol stands in chariot with four horses, shares page with Luna and two oxen.

Literature: Byvanck, *De platen in de Aratea van Hugo de Groot*.1949; McGurk (1981) 319; E.K. Rand, *A Survey of the Manuscripts of Tours I*, Princeton NJ (1929) Nr. 172, S. 185 f;

D. Kidd, 1997.

T St Gall, Stiftsbibliothek Codex 902 (c.837)

Cicero's *Aratea* and *revised Aratus Latinus* part of astronomical anthology at St Gall; made at or near St Gall. Very large compilation with variety of writings; includes Bede's *De temporum ratione* and complete *De astronomia* of Hyginus, works of Hrabanus Maurus, computistical texts and excerpts of 'Seven-Book Computus'. Has two Plinian diagrams, but not excerpts from Pliny usually associated with diagrams. An example of popularity of invented diagrams; perhaps considered more interesting than texts they illustrated. Also has celestial map on folio 76. Map divided into two spheres, depicting northern and southern constellations; ecliptic shown as band with Signs of Zodiac drawn in little blocks. Number of constellations greatly abbreviated, and circumpolar constellations omitted.

Literature: A. Bruckner, "Scriptoria medii aevi Helvetica III", *Die Schreibschulen der*

Diözese Konstanz: Sankt Gallen 2, Geneva, (1938) 122; A. Merton, *Die Buchmalerei in St. Gallen vom 9. Bis zum 11. Jahrhundert*, Leipzig (1923) L.56057 49-51; McCluskey (1993) 167; Jones, Bede, the Schools and the Computus, ed. Wesley M. Stevens, Variorum (1994) 78; Jones, "Bedae Opera Didascalica", 1 (DNR), p.181 no. 95; Jones, Cambridge: Medieval Academy of Amer. (1943) "Bedae Opera Didascalica", 2 (DTR), p. 252, no.191; Viré, Ghislaine. *Hygini De Astronomia*, Stutgardiae et Lipsiae: (1992)172, no.64.

T St Gall, Stiftsbibliothek Codex 250 (ca. 889)

Second St Gall manuscript is also large compilation, copy of St Gall 902; also made at or near St Gall. Has *revised Aratus Latinus* bound with fragments of Cicero, Hyginus and Bede's *De temporum ratione* and *De temporibus*. Like its model, also includes two Plinian diagrams without his text.

The following manuscripts are designated only with text of Aratus, mainly fragments, but they do not list to which Latin translation they belong, possibly the *revised Aratus Latinus* (or not).

T Dijon, Bibliothèque Municipale MS 448 (11^{th} c.)

Contains various astronomical and computistical treaties, including Isidore's *De natura rerum*, without illustrations. Many diagrams are independent of any text. Two different diagrams of heavens pictured. First diagram is circular band of each planet with Earth in middle; Sun, Moon and five planets are personified and drawn waist high aligned atop outer circle. Other celestial diagram shows zone of ecliptic filled in with illustrations of Signs of Zodiac; in center are Draco and Ursae. Illustrations accompany Ps-Bede text with 40 constellation images depicted, beginning with Draco between two Bears, ending with Hydra, Corvus, Crater, and Anticanis. Each page has text and images interspersed in one or sometimes two columns. Latin text placed above llustrations in 'papyrus' format; text written in brown ink, drawings are reddish orange. Stars included as dots strategically placed, but not accurately.

ff.63v and 64: two diagrams of heavens

ff. 1-71: astronomical texts, annals of monastery of Saint-Benigne, Dijon. Pseudo-Bedan treatise, *De signis caeli*, accompanied by fragments of *Arati de astrologia*,

ff.71v-72: short treatise by Pseudo-Hyginus. Also Lorsch calendar, Bede's *De temporibus*; Helpericus Sancti Galli, *Ars calculatoria seu Liber de computo*. Concludes with several more Bede treatises, *De temporum ratione, Chronica maiora*, and *De natura rerum.*

Miniatures: f.64v Draco and Ursae; 65 Aries

Literature: Y. Zaluska, *Manuscripts enluminés de Dijon*, Paris (1991) 30-33; B.Kühnel,

The End of Time in the Order of Things: Science and Eschatology in Early Medieval Art, Regensburg: Schnell & Steiner, (2003) 108; Saxl and Meier, *Verzeichnis astrologischer*; M. Destombes, *Mappemondes A.D. 1200-1500*, Amsterdam (1964) 47; B. Munk Olsen, *L'étude des auteurs classiques*, I, Paris (1982) 335.

UNDETERMINED TEXT

T **Salzburg, Universitätsbibliothek M I 36** (15th c.)

Includes fragments of *Aratea*, has 178 ff. with both German and Latin text. Contains some diagrams, but no illustrations. On microfilm at HMML.

T **Harvard University, Houghton Library MS Typ 43** (ca.1425)

Astronomical miscellany, 237 leaves, paper. Probably made in Vienna. Written in brown and red; miniatures and diagrams in pen and ink. Image placed after description. Only few have stars marked. Some illustrations squeezed together, juxtaposed on page. Miniatures have some colored washes applied. Bought by Harvard in 1946. All images are on-line at Hollis Catalog, Harvard Library.

ff.1-80: texts includes Alfonsine Tables with conversion factors for Vienna

ff. 153-58: illustrations of 46 constellations, several on page

ff. 166-72v: Michael Scot, *Liber de signis et imaginibus*, constellation illustrations, and Signs of Zodiac

ff. 176v: Aratus Solensis, *descriptio sphaerae et signorum zodiaci*

ff. 176v-178v: Bede, *De constellationibus* (probably Ps.-Bede)

ff. 179-237: Accursius of Parma with a few diagrams, *Astrolabium sphaericum*, Franco of Polonia, Dominicus de Clavasio, *Practica geometric* and others.

Literature: W.H.Bond and C.U.Faye, *Supplement to the Census of Medieval and Renaissance Manuscripts in the United States and Canada*, New York: The Bibliographical Society of America, (1962) 255; R.Wieck, *Late Medieval and Renaissance Illuminated Manuscripts*, 1350-1525- in the Houghton Library, Harvard College Library, Cambridge, MA (1983) 86-87.

T **Oxford, Bodl. MS Laud Misc. 644, (S.C. 1487)** (ca. 1268)

Astronomical anthology with 226 ff. Includes fragments of *Aratea*, with illustrations on 8 folios; 5 to 8 constellations depicted on each, no frames, little color, red and light orange wash. Pictures integrated with text, similar to *Liber Floridus* constellation miniatures. First miniature are Ursa Minor and then Ursa Major, not shown with Draco. Hercules, back view with club and lion skin. Small red dots for stars, the numbers agree with text in number, but not accurately placed.

ff. 1-7v: astronomical texts, *Aratea* mingled with Pseudo-Bede.

ff. 11-226: computus diagrams, Abu Ma'shar, Ptolemy's *Almagest*, and Grossesteste treatise.

Miniatures: f.8 Draco, Ursae, Hercules, Corona, Serpentarius and Boötes; 8v Virgo, Gemini, Cancer, Leo, Auriga, Taurus and Cepheus; 9 Cassiopeia, Andromeda, Pegasus, Aries, Triangula and Pisces; 9v Perseus, Lyra, Cygnus, Aquarius, Capricorn and Sagittarius; 10 Aquila, Dephinus, Orion, Canis, Lepus and Argo; 10v Cetus, Eridanus, Pisces Magnus, Ara, Centaurus, Hydra, Corvus, Crater and Anticanis.

GREEK TEXT OF ARATUS WITH SCHOLIA

T **Città del Vaticano, Biblioteca Apostolica Vaticana Codex Vat. Gr. 1087** (15^{th} c.)

Byzantine manuscript of *Phaenomena* of Aratus with Greek text held in Vatican Library, obviously copied from ninth-century prototype (such as Cod. Vat. Gr. 1291, derived from Late Antique prototype).[541] Unlike most Greek Aratus manuscripts, is illustrated with constellations, text is missing, which must have been one of many commentaries to *Phaenomena*. Pen drawings look back to early model. Very similar to Rhabanus Maurus illustrations. Contains zodiacal diagram with Sol and Luna personified, wearing classical garments. Also includes celestial map with curious type of projection. Amidst scholia on f. 42, diagram of circle encloses regular hexagon, with sun outside circumference. Northern and southern hemispheres not represented in two separate drawings as usual, they are divided by horizontal section through ecliptic. Whole globe is flattened out into one panorama, consisting of five concentric circles. As a result, constellations appear in grotesque distortion.[542] This manuscript demonstrates that as late as 15^{th} century, pictures such as these preserve fairly intact the feeling for ancient form.

Literature: K.Weitzmann, *Studies in Classical and Byzantine Manuscript Illumination*, University of Chicago Press (1971) 148; Weitzmann, *Roll and Codex* (1970) 96 and 144; Panofsky and Saxl, "Classical Mythology in Mediaeval Art", *Metropolitan Museum Studies* (1933) 228-280

T **el Escorial, Scorialensis Γ III 3** (late 15^{th} c.)

Byzantine manuscript, *Aratea* in Greek, two Aratean texts precede scholia, and is illustrated.

T **Madrid, Biblioteca Nacionale Codex Matritensis 4691** (1465) Greek, not illustrated.

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541 Panofsky and Saxl 233
542 Panofsky and Saxl 233

T Cambridge MA, Harvard University, Houghton Library MS Typ 18 (ca.1490.)

Anthology of Greek poetry, 146 leaves. Written in Italy, Florence?, by Joannes Rhosos, presented to Harvard Library in 1948. Aratus, *Phaenomena* (106-130v; vita and scholia 131-146v). Bound with Ps.-Orpheus, Argonautica and Hymns, Moschus, Musaeus, Hero and Leander. All in Greek. Only one decorated page, f. 1, historiated initial with Orpheus playing a viol to animals, and at bottom a circular miniature of the Argo, these may be work of Benedetto de Silvestro. The only example I've come across that has Aratus bound with poetry.

Literature: Bond and Faye, 252-53; Wieck, (1983) 119; J. Martin, *Histoire du texte des Phénomènes d'Aratos*, Paris (1956) 258-59.

APPENDIX C

> For it was Zeus himself who fixed the signs in the sky,
> making them into distinct constellations, and organised the stars for the year
> to give the most clearly defined signs of the seasonal round to men,
> so that everything may grow without fail. Aratus (11-15) Kidd

DESCRIPTION AND ICONOGRAPHY OF THE CONSTELLATIONS

This appendix includes the listing, description and assorted illustrations of the forty-five constellations in the Greek poem, the *Phaenomena*, following the order designated by Aratus as well as excerpts from his poetic interpretations of each constellation.[543] Since the *Phaenomena* comprises the oldest surviving account of the names and relative positions of the constellations, this celestial system embodied within its poetic verses played an enormous role in the early history of astronomy. Passed orally from generation to generation, the ancient star groups, as described by Aratus, are those constellations that are still used by modern astronomers, both

[543] The exact number of constellations was never standardized in the ancient nor the medieval world. Ptolemy, whose *Almagest* is the 'bible' of astronomy, listed forty-eight constellations in the seventh and eighth books. Ptolemy includes another horse, Equus, another dog Canis Minor, the Southern Crown, and the Southern Fish. He also lists Ophiuchus and Serpens as two separate constellations; he does not list the Pleiades as a constellation, but includes them as part of Taurus. The 'star catalog' of Ptolemy is almost certainly the same one given by Hipparchus, edited by Ptolemy to correct the changes caused by precession. Hipparchus listed forty-nine constellations in his *Catalog* and forty-six in his *Commentary on Eudoxus and Aratos*. Hyginus included only forty-two constellations in his *Poetica Astronomica.*

amateur and professional.[544] The only constellation listed by Aratus that is not used by astronomers or celestial mapmakers today is Argo, or Navis; it has been subdivided into three smaller constellations, as it was way too vast and unwieldy.

In addition to providing the individual names of the constellations in his poem, Aratus also includes basic information known to the Greeks on the structure and terminology of the celestial co-ordinates, the tropics, the equator, and the ecliptic. Some ancient Greeks believed that the entire field of fixed stars was imbedded into a crystalline sphere that rotated a full 360 degrees every twenty- four hours. In addition, each of the 'seven planets' was attached to its own sphere, which moved at variable speeds along a confined path, called the ecliptic. These celestial orbs encircled the Earth, a terrestrial sphere sitting stationary at the center of the entire universe. This body of fundamental astronomical knowledge from the classical scientific tradition was transmitted to the Middle Ages, not directly from Greek authors, but through Roman Latin intermediaries, such as Macrobius, Martianus Capella, and the *Aratea* manuscripts.

Appendix C has examined the appearance, descriptions and myths of the constellations, including the translations of appropriate sections of the original poem of Aratus. The iconography of each constellation is discussed. Examples of the various types of constellation miniatures that appear in the *Aratea* manuscripts are pictured along with other popular constellation illustrations, such as Hyginus and Michael Scot, for comparison.

Origins of the Constellations

The exact origin of the figures represented in constellations is irretrievable in the

544 Astronomers now recognize 88 constellations, covering the entire sky with no overlaps and no gaps between them. This is a recent development in astronomy which systematized the celestial maps in modern times.

greyness of antiquity, a date unknowable nor of particular concern for this study. What is of concern are the concepts that are represented in these forms and the role that artistic representation of heavenly forms plays in the transmission of astronomical knowledge. For the myths and figures firmly fixed in the constellation cycle are the elementary roots of astronomical science. The most important study on the antiquity of astronomical knowledge is *Hamlet's Mill: an Essay Investigating the Origins of Human Knowledge and its Transmission through Myth* by G. DeSantillana and H. von Dechend, former historians of science at Harvard. Their lifelong research presents ample evidence to prove their startling theory that important myths in every culture have one common origin that is their celestial cosmology. The Harvard scholars contend that all the tales and adventures of the gods, heroes and characters of worldwide myths are but symbols or ciphers for the movements of stars and planets. Myth becomes a simplified, easily-retained language for the perpetuation of complex astronomical data. The ideas of the Harvard researchers, challenging the evolutionary biases of theoretical science, were too revolutionary to be accepted by most of the scientific community, and have yet to be fully absorbed. New studies in the history of science have demonstrated that the astronomical material found in the *Phaenomena* reaches much further into the past than the time of Eudoxus, and that the poem acts as a vital link in the transmission of ancient knowledge through myth, poetry and art.[545]

The formation of the individual constellations was not just separate creations inspired by a poet's imagination, accumulated gradually over time simply to provide entertainment. Surprisingly, the research of historians of astronomy have provided important scientific evidence

[545] A recent investigation of Homer's *Illiad* applies an astronomical interpretation to the characters in the tale, *Homer's Secret Illiad* by Florence and Kenneth Wood.

that the constellation figures were developed as a complete package and set into exact patterns in deep antiquity.[546] After a long and insightful investigation, astronomer Michael Ovenden states, "I think that there can be no doubt, in view of the results of these investigations, that, far from being the idle fancies of a primitive people, the constellations represent an ordered mapping of the sky".[547] Ovenden presents evidence that "the constellations were designed at a definite time and place, in a very logical way, for a definte purpose".[548] Ovenden and other astronomers as well had noticed discrepancies when studying the astronomy of Aratus/Eudoxus, which was perplexing since Eudoxus was a trustworthy astronomer. These variations in the verses of the *Phaenomena* lead the astronomers to look for an earlier date when the positions stated in the poem would have been more accurate. Through mathematical calculations, Ovenden demonstrated how he was able to pinpoint the time period and the exact latitude at which the astronomy of Aratus would have been 'correct'. Ovenden credits Hipparchus for leading him to this conclusion; since Hipparchus himself noticed discrepancies in Aratus' descriptions when compared with his own observations of the positions of the constellations.[549] As discussed in Chapter 5, astronomers have established that the observations of the stars, as noted in the poem by Aratus, actually attest to a much earlier time, probably to observations recorded in Crete

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[546] Here I am summarizing information from a lecture given to the Royal Philosophical Society of Glasgow by Michael W. Ovenden ,"The Origin of the Constellations" and subsequently printed in their prestigious publication, *The Philosophical Journal*. His conclusions have been verified and expanded upon by later astronomers, Mary Blomberg and Göran Henriksson in "New Arguments for the Minoan Origin of the Stellar Positions in Aratos' *Phainomena*".

[547] Ovenden 13

[548] Ovenden 2 The astronomical details that prove his theories are rather technical and can be read in his journal article.

[549] Perhaps the astronomy of Aratus led Hipparchus to question and research celestial motions that resulted in the publication of his 'discovery' of the essential concept of the Precession of the Equinoxes.

around 2800 BCE.[550]

Furthermore beyond the early date and unexpected location of the original composition, Ovenden believes the organization of the heavens was purposefully created as a whole unit. He presents a convincing explanation of the intriguing theory that the figures, animals and objects represented by the constellations were not randomly designed simply as amusement, idle fantasies or even memory devices for primitive people. Instead, the careful layout of the pictorial program as an entire program provides important scientific knowledge. All areas of the sky have a random mixture of bright and dim stars with no perceptible relationship to one another, but those who designed the system of constellations which we have inherited chose specific areas of the sky, and then oriented the figures in exact directions. Finally they applied well-known stories to signify particular areas, avoiding certain areas and mapping out others which fit into their design.

By determining the distribution of the constellations over the vault of the sky, certain conclusions can be drawn. It is no accident that the zodiacal constellations form a belt around the ecliptic, and that a ring of constellations centers on the north celestial pole. Ovenden shows how exceptional features of the constellations become apparent; in particular, significant points on the celestial sphere seem to be associated with serpentine or dragon-like forms. The constellation of Draco links the celestial pole[551] with the pole of the ecliptic, and the coils of the constellation

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[550] See also Mary Blomberg and Göran Henriksson, "Literary and Archaeoastronomical Evidence for the Origins of the Hellenic Calendar in the Aegean Bronze Age", in *Ad Astra per Aspera et per Ludum*, and Sergey Zhitomirsky, "Aratus" *Phainomena*: Dating and Analysing its Primary Sources", *Astronomical and Astrophysical Transactions* 17.

[551] That is, the celestial pole at the time when the constellations were first established.

Serpens turn through 90E at the autumn equinox. The sinuous figure of Hydra, the Water-snake, extends for 90E and marks, quite accurately, the celestial equator at about 3000 BCE. There are many more examples, but just these few furnish ample evidence that the constellations were not envisioned because of their resemblances to mythological figures, but rather as an elemental form of celestial co-ordinates. Creating these specific patterns in the sky manifests the earliest intermingling of 'science' and art. But why, and more importantly, how would early societies encapsulate this astronomical information, and then manage to pass it on orally, keeping it intact through the generations for at least two millennia, until written down by the ancient Greeks? To explain how this knowledge could have been maintained in a basically non-literate society for over two thousand years, Ovenden suggests poetry. His argument maintains that the strict metric form of poetry places a restraint on the subject matter, discouraging alterations, additions or omissions, keeping the specified data intact.

These current discoveries and a clearer understanding of the astronomy in Aratus' poem demonstrate the deep connections of science, poetry and art, inspiring even more questions concerning this long tradition. Was the *Phaenomena* the continuation or reincarnation of an even more ancient astronomical poetic tradition? Did an earlier oral tradition have a significant role in the writings of Aratus, in addition to the scientific output of Eudoxus? These questions can probably not be answered, but has anyone really looked? Since most of the myths associated with the constellations refer to Greek and Roman mythological figures, how could this theory of a more ancient origin be adapted or explained? This problem could be answered more readily since the mythological stories are archetypal. Many early cultures have similar stories with the

exploits of typical heroic and tragic figures, which are interchangeable with Greek myths. Although modern scholars have been re-interpreting this ancient knowledge, it was not part of average awareness during the Middle Ages. Medieval scholars, artists, or patrons maintained this body of astronomical information out of respect for antiquity, not because they recognized the deeper scientific implications.

Invigorated with this broader, more universal interpretation of Aratus' poem, it is helpful to examine the structure, contents, and arrangment of the poem. The forty-four (or so) constellations of the poem will be discussed individually, both as described by Aratus and his translators, and as interpretated in artistic renderings. Additional descriptive information supplied by Hyginus' *De astronomica* is also included for comparison.

Structure of the Poem

The verses of the *Phaenomena* explain the phenomena of the celestial sphere in a systematic order, first describing the positions of the constellations in relationship to each other, including some of their myths. Next Aratus recounts the motions of the constellations, as they rise and set, each in their designated turn and at their appointed times throughout the solar year. The poem credits the order and dependability of the cosmos to the beneficence of Zeus; this divine elemental force credited to Zeus corresponds with the Demiurge of Plato, the Prime Mover of Aristotle, and the Trinitarian God of Christianity. According to Hipparchus, Aratus designed this description of the heavens, not from his direct observation of the night sky, but instead followed the arrangement of Eudoxus in his writings and on his celestial globe. Aratus avows that the constellations were not randomly arranged in the sky simply as ornaments, but for

the more practical purpose of forming recognizable patterns and to providing warnings of seasonal and weather changes for those on Earth.

Aratus arranges the constellations into two different groups, dividing those to the north of the ecliptic from those to the south with a short transitional passage between them. The northern area of the sky is more vast, embracing all twelve Signs of the Zodiac. The constellations south of the ecliptic are much fewer in number; limited to those visible in the Mediterranean area. The poetic descriptions begin with the circumpolar stars, the two Bears and the Dragon, then radiates outward, following the system created by Eudoxus.[552] In manuscripts, they are usually combined as the first contellations illustrated. The following verses drawn from the *Phaenomena* are taken from the Greek original, as translated by Douglas Kidd; the arrangement of the constellations into separate groups is also after Kidd.

A. 1-18 Proem: hymn to Zeus as beneficent father-god who designed the constellations as a guide to the changing season. [1-14] invocation of Zeus and the Muses [15-18]

B. 19 - 461 The constellations and how to recognize them.
19 - 26 The rotation sky, its axis and poles.
26 - 62 The northern circumpolar constellations: Two Bears and Draco
63 - 90 The Dragon's head group: the Kneeling Figure, Crown, Serpent-holder and Serpent and Claws.
91 – 146 The Great Bear's tail group: Bootes, Maiden, nameless stars.
147 – 178 The Great Bear's body group: the Twins, Crab, Lion, Charioteer, Bull.
179 – 267 The Cynosura group: Cepheus, Cassiepeia, Andromeda, Horse, Ram, Triangle, Fishes, Perseus, Pleiades.
268 – 318 The kneeling figure group: Lyre, Bird, Water-pourer and Capricorn, Archer, Arrow, Eagle and Dolphin.
319 – 321 Transition to southern stars.
322 – 352 The Orion Group: Orion, Dog, Hare, Argo.
353 – 401 The Sea-monster group: Sea-monster and River, origin of the constellations, Southern Fish, the Water stars.

[552] Kidd, Word by word analysis of the text can be read in his commentary 174 - 577.

402 – 450 The Altar group: Altar, Centaur and Beast, Hydra, Bowl, Raven and Procyon.

451 – 453 Conclusion to the constellations.

454 – 461 The erratic movements of the five planets.

C. 462 – 757 The passage of time and how to estimate it by observing the constellations and the sun and moon.

462 – 558 The four celestial circles: introduction, and the Milky Way for comparison, the northern tropic, the southern tropic, the equator, the ecliptic.

559 – 732 Simultaneous risings and settings: the time of night, to be estimated by observing the stars on the horizon.

Weather Signs

D. 758 – 1141 Local weather signs observable in natural phenomena and the behavior of birds and animals.

758 – 777 Second proem on the weather at sea and the value of learning the signs.

778 – 908 Celestial signs, from the appearance of the moon, the sun, the Manager.

909 – 1043 Misc. signs of weather conditions: of wind, from birds and natural phenomena; of rain, of fair weather, from clouds, stars, lamps and birds; of storms, from stars, cloud, birds and domestic life.

1044 – 1103 Seasonal signs: from vegetation of winter from farm life, of drought from comets, of summer from birds.

1104 – 1141 Local signs of bad weather from animals.

E. 1142 – 1154 Conclusion: a summing-up of the principal lessons.

Since the translations of Cicero and Germanicus survive in greater numbers than Avienus, the following is a comparison of the lines of verse in their respective poems. Aratus' description of the northern and southern constellations consist of lines 19-558; whereas Cicero's description of the same area of the heavens survives in lines 1-340. Cicero's poem is missing the northern circumpolar constellations; the Dragon's head group; the Great Bear's tail group; the Great Bear's body group; and the Cynosura group. Manuscripts of Cicero's poem begin with the description of Aries (which compares to line 229 in Aratus) and then continues with the

remaining northern and southern groups. Cicero mentions the planets (lines 223-36) and the circles (lines 237-340). The risings and settings of the constellations in Cicero's version are discussed in lines 341-480; the same section in Aratus is found on lines 559-757. Germanicus' descriptions of the constellations, planets and circles are covered in lines 17-572 and his rising and setting section is lines 573-725.

THE CIRCUMPOLAR GROUP: The BEARS, and The DRAGON (19-62)

1. Ursa Minor, Cynosura

> The numerous stars, scattered in different directions
> sweep all alike across the sky every day continuously for ever.
> The axis, however, does not move even slightly from its place,
> but just stays for ever fixed, holds the earth
> in the center evenly balanced, and
> rotates the sky itself. Two poles terminate it at the two ends;
> but one is not visible, while the opposite one in the north is high above the horizon.
> On either side of it two Bears wheel in unison, and so they are called the Wagons.
> They keep their heads for ever pointing to each other's loins,
> and for ever they move with shoulders leading,
> aligned towards the shoulders, but in opposite directions.
> If the tale is true, these Bears ascended to the sky from Crete
> by the will of great Zeus, because when he was a child
> then in fragrant Lyctus near Mount Ida,
> they deposited him in a cave and tended him for the year,
> while the Curetes of Dicte kept Cronus deceived.
> Now one of the Bears men call Cynosura by name, the other Helice. (19-37)

Aratus launches his ode to the stars by introducing the two Bears, who are always visible and rotating in unison round the stationary pole star. With these primary stars, Aratus ushers in the first catasterism of the poem, but qualifies their story with a disclaimer, "if the tale is true". He recognizes the two faithful Bears who cared for the infant Zeus; in return, Zeus rewarded their year of nurturing by immortalizing them, and placing them where they will forever be navigational guides for those who sail the seas. Known more commonly today as the Big and Little Dippers, also called the Wains or Wagons, the Bears are probably the most familiar and easily-found constellations when looking to the north. After locating the Bears, stargazers are

able to orient themselves, then by reciting the verses, follow the narrative thread as it guides the viewer through the sky naming one by one the other constellations. Of these two circumpolar star groups, Ursa Minor is much less significant, fainter and smaller, in contrast to its principal importance as provider of the current pole star, Polaris. Even though the two Bears possess quite similar patterns and consist of the same number of stars, Ursa Major dominates the sky on clear nights.

2. Ursa Major, **Helice**

> Helice is the one by which Greek men at sea
> judge the course to steer their ships,
> while Phoenicians cross the sea relying on the other.
> Now the one is clear and easy to identify, Helice,
> being visible in all its grandeur as soon as night begins;
> the other is slight, yet a better guide to sailors,
> for it revolves entirely in a smaller circle;
> so by it the Sidonians sail the straightest course. (37-44)

The seven bright stars that form Ursa Major's ladle-like pattern make up the Bear's body and tail only; adjacent stars fill in the head and shoulders to create the entire animal. Visible as soon as the sky darkens, the Big Dipper is found lying close to the Little Dipper and their 'cups' can be imagined as pouring into each other. While the two Bears are revolving round the fixed pole star, each holds its head toward the other's loins; they circle continuously, back to back, facing opposite directions, never setting. In illustrations, artists do not regularly follow this 'correct' form, the Bears are depicted in various positions. These first three constellations are almost always combined into a triple arrangement. In most cases, Draco appears more snake-like than dragon-like, wound round the Bears. The writings of Hyginus, *De astronomica*, present similar information, agreeing that the Bears were nurses of infant Zeus; and that the Greeks applied the names "Bear" or "Wagon. But he reports that the Romans referred to the Bears as 'oxen', and so provides an explanation for the name Boötes or plowman given to that nearby constellation.

3. Draco, The Dragon

> Between the two Bears, in the likeness of a river, winds a great wonder,
> the Dragon, writhing around and about at enormous length;
> on either side of its coil the Bears move, keeping clear of the dark-blue ocean.
> It reaches over one of them with the tip of its tail,
> and intercepts the other with its coil.
> The tip of its tail end level with the head of the Bear Helice,
> and Cynosura keeps her head within its coil.
> The coil winds past her very head, goes as far as her foot,
> then turns back again and runs upwards.
> In the Dragon's head there is not just a single star shining by itself,
> but two on the temple and two on the eyes,
> while the one below them occupies the jaw-point of the awesome monster.
> Its head is slanted and looks altogether as if it is inclined towards the tip of Helice's tail:
> the mouth and the right temple are in a very straight line with the tip of the tail.
> The head of the Dragon passes through the point where the end of setting
> and the start of risings blend with each other.(45-62)

The sprawling constellation of the Dragon, or Draco, writhes between the two Bears, who lie on either side of the Dragon's tail, the tip of its tail ends near the head of Ursa Major. Legend records that originally the Dragon was placed in the land of the Hesperides by Hera, as the guardian of her Golden Apples. At the marriage of Hera and Zeus, the other gods had given them many gifts, Hera especially like the Golden Apples brought by Gaea and ordered that the tree be planted in the garden of the gods, near Mount Atlas. A huge and fierce dragon guarded the special tree against the daughters of Atlas who were constantly stealing the valuable apples. The concept of a guardian serpent was common in Greek religion and folklore, where serpents guarded springs, houses and sacred temples. The dragon was eventually killed as one of the tasks of Hercules, and then rewarded with a place in the sky by Hera. According to Aratus and Hyginus, Draco has a star on each side of its head, two on the eyes, one on the jaw; Hyginus adds that there are ten more scattered along the rest of the body, with fifteen stars in all. This precise placement of stars is rarely observed by medieval artists.

DRAGON'S HEAD GROUP: The KNEELER, The CROWN, SERPENT-HOLDER and SERPENT, The SCORPION, The CLAWS (63-90)

4. Herakles or Engonasin

> Near it there circles a figure like a man toiling. No one is able to say definitely what it is or on what task the man is intent, but they just call him the man on his knees; again, laboring on its knees, the figure looks like a man crouching. From both his shoulders arms are raised and extend in different directions to a full stretch. He has the tip of his right foot above the mid-point of the tortuous Dragon's head. (63-70)

The constellation described by Aratus next lies near to the Dragon's head, a figure on bent knees working at some arduous task; the poem leaves him nameless, and simply refers to him as, the 'man on his knees'. This phantom male has become syncretized with the mythical image of Herakles, one of the most popular images from antiquity. The iconography of Herakles/Hercules was firmly established by the Classical period, as his image appeared frequently in Greek artwork, especially in relief carvings, painted vases and coins. Even before that time, he can be recognized in the Greek art of the Geometric and early Archaic Periods by his principal identifying symbols, the tawny lion-skin (flayed from the Nemean lion), his club, and his bow and arrows. He is always associated with his Labors, ever a canonical twelve in number, but the particular tasks he performed vary through the different areas of the ancient world.

The iconography most often found in astronomical illustrations depicts Herakles as he overcomes the snake-like dragon that guarded the Golden Apples of the Hesperides; quite appropriate since this Labor was set at the edge of the world. Miniatures of this constellation usually depict heroic Heracles with a lion's skin over his left arm, a club in his right hand, the left knee bent to the ground partially kneeling, with his right knee forward. The Leiden Aratea substitutes a crook for the club. In the Egerton manuscript, Hercules raises a spear. This huge

constellation spreads out over the night sky, appropriate for a man of great strength. Herakles was blessed, or cursed, with both mortal and immortal blood, as his father was Jupiter and his mother was earthborn Alcmene. The myth relates that the vengeful Juno, suspecting Hercules might be the consequence of her husband's infidelity, made life very difficult for him by bringing discord into his life. Therefore when just a young man, Hercules was confronted by two female divinities named Pleasure and Virtue, who required him to make a difficult choice. Pleasure promised him a future life of happiness and enjoyment, and Virtue promised him a lifetime of hardship; but if he bore the hardships well, he would be richly rewarded and crowned with glory for eternity. He accepted Virtue's challenge, but was bound to perform tremendous tasks, known as the Twelve Labors; some have associated the Labors with the twelve Signs of the Zodiac. According to Hyginus, Hercules has one star on his head, a bright star on each shoulder, and others outline the rest of his body with four stars on the left hand, which represent the lion's pelt. In mid-summer the constellation of Hercules toils at his trial upside down, high above the southern horizon; the kneeling figure includes nineteen stars in all.

MS Marsh 144

The Islamic illustrations that are shown with some of the constellations in Appendix C are from the well-known astronomical treatise of al-Sˆf′, titled Kitâb Suwar al-Kawâkib al-Thâbita (*Book of Pictures of Fixed Stars*), now at Oxford, Bodleian Library, MS Marsh 144. This manuscript was produced in Iran in1009 and 'is illuminated with elegant drawings in which the old and traditional representations of the constellations, have been transformed into linear images with conventions in the representation of clothing that one sees in both Sassanian and medieval silver'. The text is in Arabic and the artistic style is pure Persian. In general the figures have large heads, static forms, fully clothed appropriately, with no background, but strong drawings,

with accurate details. The stars are precisely placed by size and location. The al-Sˆf′ manuscript calls the Kneeling Figure, Engonasin, as well. This Persian image depicts no lion pelt, and substitutes the crook for a simitar.

5. **Corona Borealis, the Crown of Ariadne**

> There too the famous Crown, which Dionysus established
> to be an illustrious memorial to the departed Ariadne,
> circles close to the back of the laboring figure. (71-73)

Near the Kneeler's back sits a small, dim constellation, called Ariadne's Crown; even though lusterless, it is quite easy to recognize because of the distinctive curve of its closely-set stars. It can be found in the northern sky, opposite the head of Draco. Legends say that Hephaestus had forged the heavenly Crown, a circlet of stars formed of fiery gold and embellished with Indian gems. Ariadne was the daughter of King Minos, and her Crown was set among the stars by her lover Dionysus, who wished to honor himself before the gods. The magical light emitted from this Crown helped to guide Theseus while he sought to discover a path through the labyrinth. Hyginus says the Corona Borealis, or the Northern Crown, consists of eight stars lying in a circle, only three are very bright.

6. Ophiuchus, Effaces or Serpentarius, The Serpent-Holder

> The Crown is close to his back, but beside the top of his head
> observe the head of Ophiuchus, and from that you can identify
> the whole of Ophiuchus as clearly visible.
> So bright are the brillant shoulders that appear lying below his head:
> even in the light of the full moon these can be visible.
> But his hands are not equally bright;
> for faint is the light that runs along this side and that;
> nevertheless even these are visible, for they are not dim.
> Both hands struggle to hold the Serpent that writhes
> round Effaces' waist. He constantly, with a good firm stance,
> tramples with both his feet the great monster. (74-84)

Serpentarius is part of a large, complex group of stars which is actually two constellations that are intertwined; a male figure and a snake. Ophiuchus stands huge and upright as he grasps

with both hands the writhing body of the lengthy serpent, most often depicted as if wrapped around his waist. In the past Ophiuchus has sometimes been associated with Asclepius, the patron of medicine, since both figures are always accompanied by their iconographic symbol, a serpent. Of the four snake-like creatures that appear among the constellations, this one is considered The Serpent. Under the feet of Ophiuchus, the dangerous Scorpion or 'great monster'reclines; and it appears that the great weight of this powerful snake-handler is being impressed upon the monster, as if to crush it. In manuscript illustrations, Ophiuchus is often pictured as standing atop Scorpio. According to Hyginus, there are a total of twenty-three stars in this sizeable double constellation, seventeen in the male figure and six in the wriggling serpent.

7. Scorpio, the Scorpion

> Scorpion, standing upright on its eye and its breast.
> But the Serpent writhes in his two hands, a short section in his right,
> while large and high it rises in the left.(85-87)

Although receiving only brief notice by Aratus, Scorpio is a beautiful constellation with a well-defined group of stars, actually appearing to form the distinctive shape of a scorpion ready for attack, with its claws extended and its tail curving upward tipped with a deadly stinger. Originally one large constellation, Scorpio has been divided into two; as its Claws now form the zodiacal sign, Libra. The autumn constellation of Scorpio contains numerous bright stars that make it easy to pick out from its neighboring stars. It is thought to be one of the earliest constellations to be named. The first magnitude star, Antares, becomes the heart of Scorpio, befittingly reddish in color; it is the first zodiacal sign to be mentioned in Aratus' poem.

Legends say that Artemis brought a scorpion forth from a hill on the island of Chios, and that it stung Orion, because he had used force against her on a hunt, and had also boasted of his skill as a hunter. It was said that Orion died from the creature's poisonous sting. As a lesson

should anyone grow too self-confident, Zeus placed the Scorpion in a prominent position among the brightest stars to remind humanity of its strength and power. When visible, the star groups act out this story each night; when deadly Scorpio threatens by rising in the east, Orion perishes by setting in the west. But luckily, Orion was given an antidote for the poison in his heel, and was subsequently restored to life by Ophiuchus/Asclepius. Ophiuchus can be seen standing atop Scorpion when the latter sets in the West, as he conquers the dangerous 'monster'. Recovered and renewed in the underworld however, Orion returns, rising again in the East. But Jupiter punished Ophiuchus for interferring in the fate of humanity, bestowed by the immortal gods, and sent Aquila after him with one of his thunderbolt. When Ophiucus sets in the West, the Eagle can be seen in a threatening position over him, symbolizing that Ophiucus is dying, mortally wounded by Jupiter's thunderbolt. So the battle between Orion/Osiris and Scorpio/Set can be followed day after day, year after year, symbolizing the eternal battle between light and dark, the ancient myth of Osiris, Isis and Set. Orion represents life and the Scorpion death.

Scorpio is one of the constellations that always remains comparatively low in the southern sky, creeping just above the horizon. When the Sun passes into the Sign of the Scorpion, who fittingly lives in dark places and is active at night, the winter season begins. Looking at a map of the heavens, the tail of Scorpio extends into a dark place in the Milky Way. The total number of stars in the Sign of Scorpio is nineteen.

8. The Claws or Libra, the Scales

> Now the point of the Serpent's jar lies close to the Crown,
> but under its coil you can look for the great Claws,
> though these are lack-luster and not at all brilliant.(88-90)

As mentioned, the constellation of Libra was originally part of Scorpio, but as a twelfth sign was needed when the Zodiac was created, the Claws were cut off from the body to form a separate star group. Therefore it was the last of the Signs to be recognized, not even named by

Aratus. Libra is the Sign which the Sun enters at the Autumn Equinox when the world is held in balance, an appropriate symbol for equal hours of daylight and night. The Scales weigh the length of the day and the night, finding them in perfect equilibrium. Its four stars are called 'lack-luster' by Aratus because of their lack of brightness, not an impressive constellation in size or brilliance. Sometimes the Scales of Libra are placed in the right hand of Virgo, who is personified as the Goddess of Justice.

BEAR'S TAIL GROUP: BOÖTES, The MAIDEN AND JUSTICE (91-136)

9. Boötes or Arctophylax, The Bear-guardian

> Behind Helice there come, like a man driving, Arctophylax, whom men
> call Boötes, because he is seen to just touching the Wagon–Bear.
> All of his is very conspicuous; below his belt circles
> Arcturus itself, a star distinct from the rest. (91-95)

Above is Kidd's translation of Aratus and below is Germanicus' version of the same passage.

> Next an old man follows Helice and threatens with his staff.
> Whether he is the Bear-Guardian or Icarus who was murdered
> on account of Bacchus' gift, he made up for a life
> that was snatched away with a constellation.[553]

Boötes, sometimes called Arctophylax or the Bear Driver, is located next to Ursa Major and appears to be following the Bears. The 'old man' was associated with the Bears when they were known as the Wagons, which explains why he is 'like a man driving'. Hyginus associated the constellation with Arcas, son of Callisto and Jupiter, a myth concerned with human sacrifice. Boötes has four stars on his right hand which never set; he also has a bright star on his forehead and one on each shoulder. As the stars of Boötes are mostly dim, attention is focused on the

[553] Possanza 202 and 207

brilliant Arcturus which sits between his knees. The total number of stars in Boötes is fourteen.

10. **Virgo, the Maiden**

> Beneath the two feet of Boötes you can observe the Maiden,
> who carries in her hand the radiant Spica.
> Whether she is the daughter of Astraeus, who, they say,
> was the original father of the stars, or of some other,
> may her way be peaceful! (96-100)

Below Boötes, the winged goddess Virgo is pictured wearing full, flowing robes; she carries in her left hand a shaft of wheat, exemplified by the bright star Spica. The heliacal rising of Spica occurs at the time of harvest, which explains Virgo's iconographic symbol. The constellation lies on the ecliptic, not very obvious or outstanding in its brightness, but in illuminated manuscripts the Maiden, the only female zodiacal Sign, is often one of the most attractive depictions.

The constellation of Virgo receives the most attention in the poem by Aratus and Germanicus, who both tell her long narrative. There are several versions of the myth of the Ages of Man associated with the constellation of Virgo. Aratus recognizes her as Astrea or Dike, the daughter of Astraeus and the Goddess of Justice, and continues his description of the Maiden with an extended passage on this theme. According to the myth, in the distant past even though an immortal, she became associated with mortals of the Golden race. She administered just laws, but the Golden race did not know crime or war, and peace reigned at that time. Eventually the Golden race was replaced by the Silver race, not quite as ideal as their predecessors; and she had to reprimand them. Eventually the Silver race died out as well, and the Bronze race supplanted them. Changing for the worse, the Bronze race was warlike and violent, no longer upholding justice; and as a result, she detested them. So she departed the Earth forever and flew to the heavens becoming catasterized, which may be why she aquired wings in artistic renderings.

Another chore assigned to Virgo, in her capacity as Dike, was to weigh the souls of those who died in order to determine whether they should go to the Elysian Fields of eternal happiness, or sent instead to places of punishment, a role assumed by St. Michael the Archangel in medieval art. On occasion Virgo is conflated with Libra, as they are both associated with the scales. She is the third Sign of the Zodiac to be described. The total number of stars in Virgo as reported by Hyginus is nineteen. In Aratus' poem, her story as Justice continues.

Justice or Dike, associated with Virgo

There is, however, another tale current among men,
that once she actually lived on earth, and came face to face with men,
and did not ever spurn the tribes of ancient men and women,
but sat in their midst although she was immortal.
And they called her Justice: gathering together the elders,
either in the market-place or on the broad highway,
she urged them in prophetic tones to judgements for the good of the people.
At that time they still had no knowledge of painful strife
or quarrelsome conflict or noise of battle,
but lived just as they were; the dangerous sea was far from their thoughts,
and as yet no ships brought them livelihood from afar,
but oxen and ploughs and Justice herself, queen of the people
and giver of civilized life, provided all their countless needs. (101-113)
.....
Then Justice, conceiving a hatred for the generation of these men,
flew up to the sky and took up her abode in that place,
where she is still visible to men by night
as the Maiden near conspicuous Bootes. (133-136)

THE BEAR'S BODY GROUP: The TWINS, The CRAB, The LION, The CHARIOTEER and The BULL (147-178)

11. Gemini, Castor and Pollux, the Twins or Dioscuri,

Beneath the Bear's head are the Twins,(148)

Aratus' presentation of the fourth Sign of the Zodiac, the twins Castor and Pollux (in Greek Polydeuces), is extremely brief, not even naming them. This constellation is clearly visible from autumn to late spring, consisting of two elongated figures marked by a pair of bright stars, sparkling side by side. These brilliant stars usually mark the heads, but sometimes the shoulders of the twin brothers. In Greece the two stars were variously identified with Apollo and Heracles,

or Amphios and Zethus, but most often with Castor and Pollux. In astronomical picture cycles, Castor and Pollux, also called the Dioscuri, are commonly represented by two male warriors, sometimes naked, holding long spears; but occasionally they take on the iconography of the lesser-known mythological pair, Amphios and Zethus, who have been associated with Castor and Pollux in Greek literature. This alternative iconography of the Dioscuri, often used during the Middle Ages, is discussed further in Chapter 5.

Although some alternative stories exist, the myth most commonly associated with the Twins is the following. The mythological brothers Gemini were sons of Leda, wife of Tyndareus, but after she had already become pregnant with twins by her husband, was visited by Zeus in the guise of a swan. The result was a double twin birth, one of each pair was mortal, Castor and Clytemnestra, and the other two, Helen and Pollux, the offspring of Zeus, were immortal. Castor and Pollux, were known to have very different temperaments; but were the most loving of all brothers, never argued, were always in agreement and joined together for many heroic exploits. When the mortal twin Castor was killed in battle, Pollux unselfishly gave one-half of his immortality to his deceased brother, so they could share life and death alternately, possibly symbolizing the dual aspects of the sky, night and day. Zeus wished to memorialize the devotion of the loving brothers by placing them together in the sky, eternally side by side. Castor and Pollux were widely revered in many sanctuaries around the Mediterranean; remains of a cult temple are extant in Sicily. Beginning in the period of the Republic, the Dioscuri were honored by appearing regularly on the coinage of Rome. On both Roman and Hellenistic coins, they appear as mounted horsemen wearing capes decorated with a star.

The Bodleian al-Sˆfi pictures the brothers with arms intertwined and completely naked, most unusual for Islamic art. These twins have no identifying attributes; the prominent stars,

Castor and Pollux, are placed near their eyes. This illustration is discussed in great detail in a doctoral dissertation, “The Emergence of Illustration in Arabic Manuscripts: Classical Legacy and Islamic Transformation” by Eva Rose Hoffman, 1982. This double constellation consists of nineteen stars. In the Middle Ages Castor and Pollux became associated with Sts. Cosmas and Damian.

12. Cancer, the Crab

> beneath her belly the Crab, and under her hind legs the Lion shines brightly.(148)

Cancer, the fifth Sign of the Zodiac in the poem, is a rather insignificant and dim star group laying to the southwest of Ursa Major, obtaining barely a line from Aratus. The Sign of the Crab marks the Tropic of Cancer, the most northerly reaches of the sun. Its name may have come from Egypt, originating from the sacred scarab beetle. The constellation Cancer is usually identified with the infamous Crab that attacked the feet of Hercules while he was performing the second of his Labors, slaying the Lernaean nine-headed hydra. Enraged by the vicious attack, Hercules crushed the Crab with his foot; but Juno took pity on the crustacean and placed it among the stars. Like its appearance in the sky, the illustrations are rather plain and uninspired. There are eighteen stars in the constellation of Cancer.

13. Leo, the Lion

> This is where the sun’s track is hottest,
> and the fields are seen bereft of their corn-ears when
> the sun first comes into conjunction with the Lion.
> This is the time when the whistling etesian winds sweep strongly
> across the broad sea, and it is no longer seasonable for ships to be under oars.
> Then let broad-beamed ships be my pleasure,
> and let helmsmen hold their steering-oars into the wind.(149-155)

Leo, the sixth Sign of the Zodiac to be mentioned by Aratus, is an easily recognized constellation, as its outline actually resembles a lion; its head is in the form of a reversed question mark, facing west. Germanicus mentions the tawny color of the Lion and his shaggy

mane, stating that the heat of summer doubles in Leo. Later mythographers name Leo as the lion that had been ravaging the valley of Nemea. The first labor of Hercules was to slay the Nemean Lion, and he succeeded, bravely killing it with his bare hands. His iconography includes the lion's skin either over his arm or tied as a cape, as a reminder of this famous exploit. Some associate the creation of this constellation with Jupiter, the king of the gods, as the lion is considered the king of the beasts. Seven stars near the tail of Leo form a triangle and are called the Lock of Berenice or Coma Berenices. The total number of stars in the constellation of Leo is nineteen.

14. Auriga, the Charioteer, including the Goat, Capella and the Kids

> If you are minded to observe the Charioteer and the Charioteer's stars,
> and rumor has reached you of the Goat herself and the Kids,
> who have often looked down on men being tossed upon the heaving sea,
> you will find the Charioteer lying large to the left of the Twin
> while opposite Helice circles his head at that extremity.
> Fastened to his left shoulder is the sacred Goat,
> who is said to have tendered her breast to Zeus:
> the interpreters of Zeus call her the Olenian Goat.
> Now she is large and brilliant, but her Kids there
> on the Charioteer's wrist shine faintly.(156-166)

The Charioteer Auriga can be found above the horns of Taurus, on the left side of the Twins, with the Goat on his left shoulder and the Kids glowing softly on his left wrist. Ancient Charioteers looked after the horses and chariots of their masters, and also watched over the livestock, kept to provide food for the dinner table. The goat and kids on his arms may refer to this function of the Charioteer. The shape of Auriga is defined by a pentagon that reaches partly into the Milky Way; its most brilliant star is Capella, the fifth brightest star in the sky. Associated with autumn, the appearance of Auriga forewarns sailors of the onset of rough sailing weather. The left hand of the western Gemini Twin points directly toward the Charioteer. In illustrative cycles, Auriga stands in his stellar chariot looking similar to, and sometimes mistaken

for, Helios. But Auriga's garments are the clothes of a worker, he is not crowned, and does not hold the great torch that lights the Sun, but simply a whip to guide his horses. Germanicus suggests that the charioteer is either Erichthonis, son of Hephaestus and Gaea, the great innovator, who was said to be the first man to harness four horses to a chariot. Zeus saw him at work and marveled that he imitated Helios' great quadriga, and thought to honor him by placing his likeness among the stars. The constellation is probably of Babylonian origin, since similar images appear on Babylonian cylinder seals. The al-Sˆf′ Auriga does not include the chariot, but he does hold a whip. There are eight stars in the Charioteer.

15. Taurus, the Bull, including the Hyades

> Near the feet of the Charioteer look for the horned Bull crouching.
> This constellation is very recognizable, so clearly defined is its head;
> one needs no other sign to identify the ox's head,
> so well do the stars themselves model both sides of it as they go round.
> Their name is also very popular: the Hyades are not just nameless.
> They are set out all along the Bull's face;
> the point of its left horn and the right foot of the adjacent Charioteer
> are occupied by a single star, and they are pinned together as they go.
> But the Bull is always ahead of the Charioteer in sinking to the horizon,
> though it rises simultaneously.(167-178)

Next to the feet of the Charioteer and west of Orion lies the fierce Bull Taurus, but only the front half of the animal, the head, shoulders and forelegs are included. The constellation of Taurus includes two beautiful and fabled star clusters, the Hyades and the Pleiades. The Hyades form a recognizable v-shaped group of stars that 'gleam on his brow' tracing the shape of the Bull's head. In mythology the Hyades were the daughters of Atlas and Aethra, the half-sisters of the Pleiades. Ovid calls the Hyades, the Rain-Bringing Stars, because the sisters were so grief-stricken after their brother, Hyas, had drowned in a well that their tears caused heavy rainfall. Five bright stars outline each side of the face of Taurus; and the brilliant, first-magnitude star, Aldebaran, becomes the Bull's eye. Above the neck of the Bull are the Pleiades, the Seven

Sisters. Aratus notes that Taurus and Auriga share the same star that forms the Bull's left horn and the Charioteer's right foot. Taurus has been identified with various mythological bulls; in particular, the tales of Pasiphae and Theseus, and with the white bull whose shape was assumed by Jupiter to attract and abduct Europa, the princess of Tyre.

According to myth, one day Europa was playing with friends close to her father's herd of bulls. She noticed an outstandingly beautiful white bull and went to stroke him, adorning him with flowers. Since the bull appeared agreeable, she climbed onto his back for a ride; and he rushed straight into the sea with his lovely rider, swimming all the way to Crete. In Crete, Europa gave birth to Minos, who became the King of Crete, and then later the father of Ariadne. This constellation was important in the ancient Babylonian era, when Taurus marked the astrological age, just before the arrival of the Age of Aries. A constellation in the form of a bull was discovered in both Egyptian and Babylonian records named as the 'First Sign' of the Zodiac. It was called the 'First Sign' because Taurus coincided with the vernal equinox approximately between the years 4000 and 1800 BCE. The total number of stars in Taurus the Bull, is eighteen. Although the Hyades are mentioned by Aratus as part of the face of Taurus, I have seen them pictured in only one *Aratea* manuscript.

CYNOSURA GROUP: CEPHEUS, CASSIOPEIA, ANDROMEDA, HORSE, RAM, TRIANGLE, The FISHES, PERSEUS, The PLEIADES (179-267)

16. Cepheus, mythological king

> Nor will the suffering family of Cepheus, son of Iasius be just left unmentioned;
> their name also has reached the sky, for they were akin to Zeus.
> Behind the Bear Cynosura Cepheus himself is like a man stretching out both his arms.
> The line that extends from the tip of her tail to each of his feet
> equals the distance from foot to foot.
> And you have only to look a little way past his belt
> if you are searching for the first coil of the great Dragon. (179-187)

The constellation of Cepheus is found in the northern part of the sky, partially circumpolar. From feet to chest he lies within the Arctic Circle, as he is upside down; the rest of his body lies between the Arctic Circle and the Tropic of Cancer. Cepheus is always depicted with long, outstretched arms; a straight row of faint stars serves as his left arm. The royal family of Cepheus, king of Ethiopia, inhabits this same area of the sky; he faces his wife Cassiopeia, and standing below them is their daughter, Princess Andromeda. According to the ancient tale, Cepheus' country was being punished, terrorized by the frightful sea monster Cetus. Since the king's efforts had been ineffective; he felt compelled to consult the great oracle of Ammon to determine a method for rendering the monster harmless. To Cepheus' horror, the oracle foretold that the only way to save his people and lands was to sacrifice his daughter Andromeda to the threatening creature. As a good and true king, he had no choice but to defend his kingdom; and so he was required to offer Andromeda as a sacrificial victim to appease the sea monster. The remorseful Cepheus extends his arms for eternity in supplication toward the gods to both save his people and spare the life of his daughter. Because Cepheus rules the Ethiopians, he is often depicted in oriental garb. Germanicus adds an interesting note in his translation, that Cepheus' family began with Jupiter, and adds not too subtlely that 'the kingly nature of one's father is often an advantage'. The stars in the constellation of Cepheus number nineteen in all, none are particularly bright.

17. Cassiopeia, Wife of Cepheus

> In front of him revolves the tragic Cassiopeia, not very large,
> but visible on the night of a full moon;
> only a few zigzagging stars adorn her, giving her all over a distinct outline.
> Like to a key with which men attacking a double door
> barred on the inside knock back the bolts,
> such is the appearance of the individual stars that together comprise her.
> She extends outstretched arms just from her small shoulders:
> you would say she was grieving over her daughter.(188-196)

Even though a haughty queen, Cassiopeia forms a modest, circumpolar constellation with only five semi-bright stars in the form of a wide-angled W. The royal couple Cepheus and Cassiopeia are unusual since they were not honored for bravery or duty to the gods, but as part of a favorite moralistic story. Like her stellar husband, Cassiopeia's arms are reaching outward, perhaps grieving the fate of her sacrificed daughter. She reigned as a beautiful queen, but her pride and arrogance caused their great misfortune. One day she foolishly boasted of being fairer than the Nereids, the water nymphs, who were celebrated for their exquisite beauty. The Nereids overheard her vain bragging and complained to their father Poseidon. Infuriated, Poseidon created a great flood and called up the monster Cetus from the depths of the ocean. Poseidon dispatched Cetus to the waters of Ethiopia to ravage the people and their herds. Only the sacrifice of Cassiopeia's daughter would appease her affront to the sea-nymphs.

In addition to losing her daughter, Cassiopeia was condemned by the gods to swing forever around the North Celestial Pole, as a lesson in humility and as punishment for her offensive boasting. The constellation actually appears in the shape of a W when below the Pole, and as an M when above the Pole. When appearing below the Pole, Cassiopeia must hang on tightly, so that she does not tumble from her throne. Twelve hours later, the mourning queen is relieved to be returned to her full upright position. The tragic figure sits grieving in her chair or throne, which Aratus does not mention here; but he discusses later in the poem. Germanicus says, "Her face contorted in agony, she stretches out her hands as if bewailing abandoned Andromeda, unjustly atoning for the sin of her mother". The al-Sˆf′ illustration of Cassiopeia shows the legs of the throne ending in lion's paws, which are often seen in the classical tradition, while the palmette-shaped knobs at the top are characteristic of Islamic work.

18. Andromeda, the Woman Chained

> There too revolves that awesome figure of Andromeda, well defined
> beneath her mother. I do not think you will have to look all round
> the night sky in order to sight her very quickly,
> so clear are her head, the shoulders on either side,
> the feet at her extremity, and all her girdle.
> Even there, however, she is extended with outstretched arms,
> and bonds are laid on her even in the sky;
> those arms of hers are raised and out-spread there all the time.(197-204)

Andromeda, the daughter of Cepheus and Cassiopeia, is found below her mother in the sky, a long line of fairly bright stars, her head coincides with Pegasus and her feet lie near Perseus. Stars mark her head, shoulders, feet and belt; her outstretched arms, chained forever, are much fainter. The ill-fated, innocent victim of her mother's arrogance suffered the punishment for her mother's vanity, her boast of beauty superior to the Nereids. Andromeda was carried to the edge of the sea, and there with her outstretched arms chained to the rocks, she waited in anticipation, expecting to be devoured by the dreadful monster Cetus. That is how she has been immortalized, bound between hope and despair, waiting and wishing for rescue from her frightful fate. By chance the 'awesome figure' of Andromeda was noticed by the brave Perseus, who just happened to be passing by after beheading Medusa. He fell in love with her instantly, and managed to save her from the sea monster.[554] Upon being rescued by Perseus, Andromeda abandons her parents, preferring to follow her rescuer to Argos. Andromeda is honored in the sky, not on her own behalf, but as a reminder of the foolishness of her mother and the courage and deeds of Perseus.

In Arab-influenced manuscripts, Andromeda can be pictured with two and sometimes three fish, covering her chest or at her feet, reflecting the star system of the early Bedouin tribes. The al-Sufi manuscript presents Andromeda as seen in the sky in three slightly different

[554] See Perseus for more details of the rescue.

versions. Version A is the more commmonly depicted manner, while B has the outline of a fish at her feet and C's version, rather oddly, has two overlapping fish covering her chest. The fish in that position are inserted from the traditional astronomy of the native Arabic societies called the Anwar. Both her hands are raised, but not chained; the bracelets worn on her wrists may be reminiscent of the missing chains.

In the Leiden *Aratea,* Andromeda is pictured partially clothed by the shore, arms chained to rocks, awaiting her fate. The group of six figures, Cepheus, Cassiopeia, Andromeda, Cetus, Pegasus and Perseus, represent all the principal figures of this moralistic tale, the only classical myth to be depicted so fully among the constellations. The constellation of Andromeda includes twenty stars.

19. Equus or Pegasus, the Winged Horse

> Now the monster horse is actually pinned to her head by its lower belly;
> there shines a star that is common to its navel and the head at her extremity.
> The three other stars mark off lines of equal length upon the flanks
> and shoulders of the horse; they are beautiful and bright.
> Its head is not at all comparable, nor its neck,
> though it is long. But the end star on its shining mouth
> could well rival the former four, which outlive it so very conspicuously.
>
> But it is no quadruped; at its navel edge the sacred Horse is halved
> in the middle as it goes round. This was the Horse, they say,
> that from the height of Helicon produced the good water of fertilizing Hippocrene.
> The summit of Helicon was not then flowing with streams, but the Horse struck it
> and from that very spot a flood of water gushed out at the stroke of its forefoot;
> the shepherds were the first to call that draught the Horse's Spring.
> So the water wells out of a rock, and you can see it
> never far from the men of Thespiae; but the Horse revolves
> in the realm of Zeus and you may view it there.(205-224)

The constellation of Pegasus represents the winged horse of heroic Perseus, born from the blood of Medusa's head as it combined with the foam of the sea. It is usually depicted upside down as a demi-horse, only the front half of his body appears, made up of bright stars near Andromeda. The Princess' head is attached to the navel of the Horse by a common star, this star plus three more brilliant stars form the Great Square in Pegasus. (Other less bright stars form his

head and the forelegs that are featured in his story, eighteen stars in all. Aratus does not mention wings on the horse, but that mythical tradition dates back to Hesiod. After Perseus delivered the head of Medusa, Pegasus flew off to Mount Olympus where he became the bearer of thunder and lightning for Jupiter. In illustrations, the half-figured Pegasus is almost always drawn with colorful wings, large enough to lift the powerful horse in flight. In the al-Sufi illustration of Pegasus, his curled wings are no longer those of a bird, but of a fabulous Sassanian dragon.

20. Aries, the Ram

> There too are the paths of the Ram, the swiftest because it speeds round
> the longest circle and yet does not lag behind the Bear Cynosura as it runs.
> The Ram itself is faint and starless, as if observed by moonlight,
> but you can still identify it from the girdle of Andromeda:
> for it is set a little way below her. It traverses the great sky centrally,
> where the tips of the Claws and Orion's belt revolve.(225-233)

As the first Sign of the Zodiac, Aries the Ram is one of the most important constellations for calendrics and astrology; but its stars are faint and inconspicuous, except for one bright star in the head. The Ram is usually pictured with a full body, often running, its head to the right or the East, but turned and looking back. It is frequently drawn with a band or circle around its mid-section, referring to the band of the Zodiac or the equinoctial colure. This is important since Aries appears at the meeting place of the ecliptic and the equator. The constellation of Aries was the group of stars in the background when the sun rose at the vernal equinox from about 2000 BCE. The sun has precessed further along its rhythmic cycle; and the background stars at the vernal equinox are now the constellation Pisces. In approximately 21,000 years, the sun will again introduce Aries as the indicator of the vernal equinox.

There are several mythic stories centered around the celestial Ram. Briefly the most common myth concerns two children, Phrixus and Helle, who were raised by an evil stepmother. She convinces her husband, their father, to sacrifice his daughters to the gods in order to save the

town and its crops from disease. Their real mother in heaven, sends the Golden Ram to save the girls from the plans of the nasty stepmother. The children are told to climb on the Ram's back and hang on tightly, but not to look down from the great height. Of course one child named Helles did, and the spot where she fell is called the Hellespont in her honor. After the fall of Helles, the Ram brought the other child Phrixus to Colchis. She sacrificed the Ram to Jupiter, or it flew off to become a constellation, its Golden Fleece was then nailed to a tree. The golden fleece was subsequently recovered by Jason. Hyginus adds two more versions of the Aries myth. Neither Aratus nor Germanicus identifies the Ram or associates it with the Golden Fleece. Germanicus says that Aries moves through the longest circle in the sky. "His swiftness as hastens to touch the distant turning post with his horns" allows him to keep up with the other constellations that have a shorter distance to travel. Aries is the eighth Sign of the Zodiac to be discussed in the *Phaenomena*, and its total number of stars is seventeen.

21. Triangula, or Deltoton

> There is yet another constellation formed near by beneath Andromeda:
> the Triangle is measured out on three sides, recognizably isosceles;
> the third side is shorter, but it is very easy to find,
> for it is well starred compared to the other two.
> Its stars are a little to the south of those of the Ram. (233-238)

Deltoton is positioned below Andromeda and to the right of the Ram; it takes the form of a small isosceles triangle, or the triangular shape of the Greek letter delta. The Triangle is not especially bright, but distinctive enough to be easily recognizable. There are at least four different stories surrounding the Triangle. Because the island of Sicily also takes the shape of a triangle, sometimes it is associated with this small constellation. Ancient myths tell that Sicily received an honored place in the sky as a reward from Ceres for its devotion to her. The inhabitants had honored Ceres with many temples, thankful that the volcano, Mount Etna,

continually created fertile soil for the island's farmers. Another account says that perhaps the geometric form of the Triangle symbolizes the accomplishments of the Greeks and their advances in mathematics. Germanicus traces the origin of the Triangle to the Nile, perhaps referring to the river's delta where it meets the Mediterranean. According to Hyginus, Mercury placed this constellation, whose shape is that of the first letter of the word "Deus", in the sky to honor Jupiter. The constellation of Deltoton has only three major stars.

22. **Pisces, the Fishes**

> Still farther ahead and more in the approaches to the south are the Fishes;
> but one is always more prominent than the other and hears more
> the fresh onset of the north wind. From both of them stretch, as it were,
> chains from the tail-parts, coming together in an unbroken line on both sides.
> One beautiful bright star occupies this position, and they call it the celestial Knot.
> Let Andromeda's left shoulder be your guide
> to the more northerly Fish, for it is very close to it. (239-247)

The two fish of the constellation Pisces are found south and west of Triangula; Andromeda's left shoulder is near the more northerly Fish. Pisces is a relatively large but not brilliant zodiacal constellation; both fish are equally faint, as are the two lines that join them. The celestially 'correct' depiction of Pisces is for each fish to face in opposite directions with a rope or line extending from their tails, but more often the line leads from their mouths. The cords extending from each of the fish converge and are tied together forming the 'Knot of the Heavens'. Hyginus (3.29) explains that the Knot lies at the crucial point where meridian meets the equator, and so can be considered as the Knot of the celestial sphere.

The Roman myth concerning Pisces relates that one day Venus and her son Cupid were startled and threatened by Typhon, the monster-dragon, who could survive in fire but would perish in water. Since Venus was born from the foam of the sea, she could easily escape from Typhon through the water. So both Venus and Cupid changed themselves into fishes and disappeared into the dark blue waters of the ocean. In order that they not lose each other in the

dark water, they tied themselves together with a long rope. In this way they were able to escape the vicious Typhon; their escapade has been commemorated in the constellation Pisces, sometimes called 'Venus and Cupid'.

This constellation is significant for several reasons. In the year 7 B.C.E. a triple conjunction of Jupiter and Saturn and some of the stars in Pisces united, creating an extra bright star. This triple conjunction has often been regarded as the special star that shone at the time of Christ's birth. The Greek work for fish is *icthys*, the first letters could represent the phrase," Jesus Christ son of God, the Redeemer". The sun moved into the astrological Age of Pisces near to the birth of Christ as well; the fish therefore has many associations with Christianity. The 'more prominent' one is called the Northern Fish, which has twelve stars; the other is the Southern Fish which is comprised of fifteen stars, the cord between them is formed by twelve stars.

23. Perseus, with the head of Medusa

> The two feet of Andromeda will be pointers to her suitor Perseus, as they move
> for ever above his shoulders. He runs taller than other figures in the north.
> His right hand is stretched out towards his bride's mother's chair-seat,
> and as if on some immediate pursuit he takes long strides,
> as he runs in the realm of his father Zeus. (248-253)

Perseus, the airborne hero of classical mythology, was an obvious character to be catasterized in the sky. This constellation is relatively easy to find, having two second-magnitude and five third-magnitude stars. In his poem Aratus claims that Andromeda's two feet stand on the shoulders of Perseus, but actually only one foot comes close to his shoulder. The right hand of Perseus is extended and conveniently directs your eye toward the chair of Cassiopeia; he stands erect wearing winged shoes, his legs held widely apart, as if intent on taking 'long strides'. In his left hand, the bright star Algol represents the head of the monstrous Medusa, but this feature is not mentioned by Aratus. But in this section Aratus does introduce the chair of 'his

bride's mother', which he ignored in the previous description of the Queen. Aratus conjoins the key constellations of Perseus, Cepheus, Cassiopeia, and Andromeda and retells their tragic story explaining why the four figures are transfixed and captured for eternity in the sky.

Like many heroes in Greek mythology, Perseus was the son of a union between a god and a mortal, Jupiter and Danae. Danae's father kept her locked in a brass-lined tower to prevent her from marrying, because it had been prophesied that her son would one day murder him. Jupiter, enamored of the exceeding beauty of Danae, gained entry to the formidable tower by changing himself into a shower of gold coins. Her father was so frightened by the dire predictions that he had Danae placed in an open chest and set adrift in the sea, but she arrived safely at a nearby island and there she bore and raised Perseus. When an adult Minerva appeared to Perseus in a dream ordering him to slay the three sister Gorgons, wise Minerva gave Perseus a magical sword and warned him not to look at the frightful face of Medusa which had the power to turn him to stone. Next Mercury furnished him winged sandals to carry him over land and sea, and later Atlas bestowed on him a magic helmet that made him invisible. Perseus was able to maneuver his shield so that he would see only the reflection of the three horrible sisters. In this way Perseus was able to sever Medusa's disgusting head, writhing with snakes, and restrain it in a leather sack.

After carrying out his appointed task, Perseus mounted the mighty winged-horse Pegasus, and they were passing over Ethiopia just as the unfortunate Andromeda was being chained to the rocks. Perseus stopped and offered to rescue the beautiful princess on the condition that King Cepheus would allow him to marry her. Cepheus agreed immediately, and Perseus took up his position by the rocks not far from Andromeda, warning her to keep her eyes firmly closed. As soon as the sea monster Cetus crawled out of the water and started toward the terrified

Andromeda, Perseus jumped from his hiding place, yanked Medusa's severed head from the leather pouch and dangled it in front of Cetus. The sight of the revolting head halted the threatening sea monster, and it was instantly transformed into a great rock which, it is said, can still be seen on the Levantine shore of the Mediterranean. Perseus quickly thrust the horrible head back in his bag and freed Andromeda from her chains. A great wedding followed combined with festivities to celebrate the town's release from the terror of the sea monster.

The Islamic manuscripts depict Perseus holding a head, but it is no longer Medusa's, instead it has become that of a male demon, perhaps the streams of blood from her neck or the snake-hair were mistaken for a beard. In the sky, Perseus towers protectively over Andromeda, standing with one foot on the Pleiades, who showed him the way to Medusa. The total number of stars comprising the constellation of Perseus is nineteen.

24. The Pleiades or Seven Sisters

> Near his left knee all in a cluster the Pleiades move.
> The space that holds them all is not great, and they are individually
> faint to observe. Seven in number they are in the lore of men,
> although there are only six apparent to the eye. No star at all
> has been lost from our ken in Zeus since our oral tradition began,
> but this is just what is said. Those seven are called by name
> Alcyone, Merope, Celaeno and Electra, Sterope, Taygete and honored Maia.
> All alike they are small and faint, but they are famous
> in their movements at morning and evening, and Zeus is the cause,
> in that he authorised them to mark the beginnings
> of summer and winter and the onset of ploughing time. (254-267)

The Pleiades consist of a small, faint group of stars, but are easily found, bundled together in a tight cluster, occupying little more space in the heavens than the Moon. One of the oldest constellations, they are traditionally called the Seven Sisters 'in the lore of men'; but only six stars can be picked out in the night sky. They are positioned near Perseus, but are now considered as part of the constellation of Taurus. The Pleiades are acknowledged for their time-serving appearances in the morning and evening that announce the arrival of the various seasons,

their rising signals the onset of summer and their setting announces the coming of winter. Germanicus associates them with the Bull's back, and he lists the names of the Seven Sisters; but adds an identifier, calling them the daughters of Atlas "born of a father who supports the sky", reflecting the poetic phrases of Hesiod, and Atlas' consort, Pleione, from whom they take their name. Germanicus names the sisters in a different order than Aratus; Electra, Alcyone, Celaeno, Merope, Asterope, Taygete and Maia. According to an ancient legend, six of the sisters consorted with immortal gods, while one married a mortal, explaining her invisibility.

In illustrated constellation cycles, the Seven Sisters are treated individually as seven female heads, the Leiden *Aratea* shows Six Sisters with heads uncovered, displaying sophisticated Late Antique hair styles, surrounding the central disgraced Sister whose head is covered with a veil.

ιTHE KNEELER GROUP: the LYRE, BIRD, WATER-POURER, CAPRICORN, ARCHER, ARROW, EAGLE, and DOLPHIN (268-318)

25. Lyra, the Lyre

> The Tortoise too is small; when Hermes was actually still in his cradle,
> he hollowed out the shell and bade it be called a Lyre.
> He set it down in front of the unknown figure,
> when he had brought it to the sky. The figure, as he crouches,
> comes near it with his left knee, while the Bird's head
> at one extremity circles opposite it:
> the Lyre is set fast between the Bird's head and the knee. (268-274)

The Lyre lies on the western bank of the Milky Way, a small insignificant constellation having only one very bright star called Vega. The constellation is found near the head of the Bird, Cygnus and the knee of the 'unknown figure'. According to the mythological tale, the Lyre was invented by Hermes/Mercury when he was still in his cradle. The Lyre had seven strings

representing the seven planets or the seven daughters of Atlas. The lyre was one of the earliest and most important musical instruments of the Greeks, used mostly to accompany songs. The Lyre became an attribute of Apollo, who adapted song to accompany the lyre, and then it was passed on to Orpheus, the son of the Muse of epic poetry, Calliope, who taught him to play. Later Orpheus increased the number of strings to nine, to honor the number of the Muses. By playing the lyre, Orpheus could charm the trees, rocks and wild animals, as well as humans, but Orpheus slighted the god Liber causing great anger toward him. In punishment, Liber dispatched the Bacchae upon him, tearing him to pieces. The sorrowful Muses gathered his dismembered body, buried him and then presented him with the greatest reward by placing his Lyre in the heavens to perpetuate his memory for eternity. Germanicus tells us the Lyre was "most welcome at the banquets of the gods". Total number of stars is only eight.

26. Cygnus, the Bird or the Swan

> Yes, there is even a dappled Bird accompanying Zeus, hazy in some parts,
> while other parts on it bristle with stars, not very bright, though still not dim.
> Just like a bird in fair-weather flight, it glides on the breeze toward the horizon,
> stretching its right wing-tip in the direction of Cepheus' right hand,
> while close to its left wing lies the prancing Horse. (275-281)

Cygnus, the Swan, is a mediocre summer constellation, "not very bright, though still not dim', its neck is long and its wings are extended similar to a bird drifting in flight. Cygnus, sometimes called the Northern Cross, takes the shape of a giant cross against the background of the silvery glow of the Milky Way. The gentle Swan is persued through the heavens by the mighty Eagle, Aquila. Cygnus was the best friend of Phaethon, the son of Helios, who one day attempted to steer the mighty Sun Chariot with fatal consequences. The inexperienced Phaethon was not capable of managing the four fiery horses, and so endangered the heavens and the Earth; his flight catapulted into a fiery disaster. He was ejected from the quadriga by Jupiter and fell to

Earth like a meteor, where he landed in the river Eridanus. Because of this disastrous ride, the Milky Way is sometimes referred to as the scorched path, the remnant of the fateful ride of Phaethon. Germanicus identified the Swan that appears in the sky as either the bird of Apollo, or the swan whose form Jupiter assumed when he seduced Leda, wife of the King of Sparta, causing her to become the mother of twins, Pollux and Helen of Troy. The tail of the Swan is rich in stars, the most brilliant is first-magnitude Deneb, with a total of fourteen.

27. Aquarius, the Water-Bearer

> The two Fishes range about the Horse as it prances among them.
> Besides the Horse's head the right hand of the Water-pourer stretches out:
> He rises after Capricorn. (282-284)

Aratus barely mentions Aquarius, his tenth Sign of the Zodiac; the Water-Bearer is found in an area of the sky which he calls the Water, which the Babylonians called the Sea. The constellation of Aquarius is represented by a standing man or sometimes a boy, who pours water from a jug or urn, often holding a towel in his left hand. Usually the liquid he pours is pictured as a silvery stream of stars running into the mouth of the Southern Fish, or sometimes merging with the river Eridanus, also pictured in the sky. In Classical times, the sun rose in the sign of Aquarius during the rainy season, a possible reason for its association with water. Though neither Aratus nor Germanicus mention it, mythologically Aquarius is associated with the handsome youth Ganymede, who was abducted by Jupiter and taken to Olympus to be the Cup-bearer of the gods. For his faithful service to the gods, Ganymede was granted immortality. The liquid being poured from the jar is sometimes said to resemble nectar, the drink of the gods. In the sky, the abundant stars of Aquarius are relatively faint; as a result, it is not a conspicuous star group that stands out from the rest. This constellation is generally associated with water, not only in Greek literature, but also in Ancient Egyptian and Babylonian records; again because of its association with the rainy season. Aquarius comprises a great number of dim stars, seventeen in

the male figure and thirty-one for the stream of liquid flowing from his jar.

28. Capricorn, the Goat

> Capricorn lies ahead and lower down, where the powerful sun turns back.
> In that month I hope you will not be surged about by the sea
> through taking to open waters. Neither by day can you make much headway,
> for the days pass most swiftly then, nor in your terror by night
> will the dawn come soon, however much you cry out.
> It is then that the dread southerlies strike, when the sun meets up with Capricorn;
> then the icy cold from Zeus is more cruel to the freezing sailor. But for that matter
> the sea surges under the stem all the year long; and we, like our ships,
> turning our eyes towards the beaches; but the surf there is still far off,
> and only a little timer keeps death away. (285-299)

The constellation of Capricorn combines the head of a goat with the tail of a sea creature. The composite goat figure gained its curled fish's tail because it, like Aquarius, is connected with the rainy season; it too is located in the area of the sky that Aratus calls the Water. This constellation lies low in the sky, just above the southern horizon. Its chief importance resides in the fact that it marks the southernmost reach of the Sun at the winter solstice, giving its name to the Tropic of Capricorn. One tale of how Capricorn reached the sky as a constellation was associated with the legend of the she-goat that suckled Zeus in Crete. Another myth explaining how Capricorn came to have his unusual form, states that the gods were taken by surprise by the demon Typhon. To save themselves from his attacks, they quickly shifted their shapes into all varieties of animals. The God Pan, in the form of a goat, was playing his pipes when he was startled by the sudden approach of Typhon, and in a panic (a term derived from his name), Pan instantly dove into the nearby river, changing himself into a fish in the process. But it happened so quickly, only his back half became a fish's tail. The front part of his pastoral disquise, a goat with horns and a beard remained unchanged. This is one of the few places in the poem where Aratus uses the first person and he considers himself in tune with the hardhips of humanity, "I hope you will not be surged about by the sea". Capricorn is the eleventh Sign of the Zodiac named, and is occasionally pictured as emerging from a large seashell, another water reference.

The number of stars in the constellation of Capricorn totals twenty-four.

29. Sagittarius, the Archer

> After much suffering at sea even in the previous month,
> when the sun inflames the bow and the Drawer of the bow,
> you should put ashore in the evening and not continue to trust the night.
> A sign of that season and that month will be the rising of the Scorpion
> at the end of night. The Archer actually draws his great bow near the sting;
> the rising Scorpion stands a little ahead of him and he then rises shortly after.
> At that time the head of Cynosura runs very high up at the end of night,
> and just before dawn Orion sets entirely, and Cepheus from hand to waist. (300-310)

Sagittarius, or the Archer, takes the form of a Centaur, front-half man and back-half horse, always armed for action with a bow and arrow. There are two Centaurs in the night sky, which occasionally leads to confusion. Sagittarius is sometimes called a Centaur, a more generic title; but the Centaur is never called Sagittarius. The two heavenly horse-men exhibit entirely different personality types. Sagittarius is a powerful warlike hunter; while the Centaur, also called Chiron, is peace-loving, kind and gentle, the personification of wisdom, strength and the art of medicine. The constellation of Sagittarius contains a group of bright stars that suggest the shape of his bow, held aloft ready to shot an arrow toward the poisonous stinger in the raised tail of the Scorpion. Aratus warns his readers that when the sun is in the constellation of the Archer, avoid seafaring at night, “put ashore and do not trust the night”.

In the poem, Sagittarius is the twelfth and last Sign of the Zodiac named in the poem. Neither Aratus nor Germanicus mention any legends associated with this constellation, nor even that he is a centaur. It is relatively difficult to find Sagittarius in the sky, since it lays low in the southern sky, and is lost in the haze of the horizon. The best time for viewing Sagittarius is in June, July and August. In front of his horse-like feet are a few stars which form a circle, some say it is a wreath that he cast off. Centaurs were sometimes confused with satyrs, who were human-shaped creatures with horse’s tails, but not the body, and often goat’s legs or horns. Satyrs were wild, lusty and fond of liquid celebrations and revelry. The proper Centaurs were

depicted in two ways; as full-bodied, standing men with the hind end and back legs of the horse attached to his waist. In later art, the form often shifts to the full horse's body with the upper half of a man attached near the horse's neck. There are fifteen stars included in Sagittarius himself and seven in the wreath at his feet.

It has been noted and accepted by astronomers that Sagittarius performs a very important and amazing function in the map of the cosmos. Its particular location and the distinctive iconography of this constellation were not randomly selected, but was carefully chosen by those early astronomers who mapped the heavens and designed the constellations. Sagittarius and Scorpio are the only two constellations of the Zodiac that include features which point toward a specific direction. When viewing Sagittarius, his Bow and Arrow are pointed directly at the tail of Scorpio, both within the Milky Way. The tail of Scorpio is also represented as a pointer, usually ending in an arrow tip; the two constellations are obviously pointing to a particular place in the sky. That place to which they point is the Milky Way, and not to anywhere in the Milky Way, but at a rift in the clouds that if followed deeper into the cosmos would led exactly to the center of our Galaxy. It took modern astronomers with sophisticated instruments hundreds of years to determine what Sagittarius and Scorpio have been pointing to since ancient times.

30. Sagitta, the Arrow

> Ahead of the Archer is another Arrow lying all by itself without a bow. (311)

Aratus groups together three small constellations, Sagitta, the Eagle and the Dolphin, to complete his sketch of the northern sky. Sagitta is a small constellation consisting of just four stars, two represent the feathered end of the Arrow, a faint star at the middle and one at the tip. It lies east of the Archer's bow, and since it stands alone in the sky, interpretations suggest that it was shot into its current position in the sky. The Arrow has become associated with the two most famous archers of Greek myth, Apollo and Hercules. Sagitta was said to be the arrow of

Apollo, which he used to kill the Cyclopes, who had fashioned the thunderbolt of Zeus. This momentous arrow was transformed into a constellation and then placed in the heavens by Apollo to commemorate his struggle with the Cyclopes. Hyginus gives an alternative explanation for this constellation, writing instead that this was the important arrow used by Hercules to rescue the unfortunate Prometheus, killing the eagle that was attacking him.

31. Aquila, the Eagle

> The Bird is outstretched beside it, nearer to the north.
> Close to it another bird is wafted, inferior in size,
> but, stormy when it rises from the sea at the departure of night;
> and men call it the Eagle. (312-315)

Aquila is an undistinguished constellation, described as outstretched, both lengthwise and cross-wise; it spreads its wings, and flies toward the east, across the eastern bank of the Milky Way. Its brightest star is Altair, classified as first magnitude. An imaginary line drawn from Deneb in the Swan, to Altair in the Eagle, to Vega in the Lyre forms a distinct geometrical shape called the Summer Triangle. Aquila disappears below the western horizon near the end of November. The Eagle is honored as the only bird which boldly flies in a direct path toward the brilliant Sun, and thus holds first place among all the birds. Sometimes the Eagle is pictured with the Arrow held in its powerful talons. Aquila, the king of birds, was appropriately the royal bird of the king of the gods, Zeus/Jupiter, and performed many difficult tasks at his demand. The giant bird was ordered to swoop down upon Ophiuchus and kill him with one of Jupiter's arrows. On another day, the gods needed someone to serve at their table, thus Aquila was ordered to fly down to Earth and select the most handsome youth he could find to serve as the cup-bearer for the gods. Aquila appears in the sky flying just above Aquarius, who has been associated with Ganymede. Ultimately Jupiter placed the Eagle in the sky as a reward for his long and devoted service.

Aratus does not mention the Eagle as the bird of Zeus at this point of the poem, but does speak of it later. Germanicus combines the Eagle and the Arrow in his translation.[555] Aquila is usually pictured with either both wings closed or with just one wing out-stretched, symbolizing the fact that he is falling mortally wounded. Hyginus attributes only four stars to the constellation of the Eagle; Ptolemy gives it nine.

32. Delphinus, the Dolphin

> The very slight Dolphin runs just above Capricorn, dark in the center,
> but four jewels outline it, two lying parallel to two.
> Now these are the stars that are broadcast between the north
> and the sun's wandering path. But many others rise below this,
> between the south and the track of the sun. (316-321)

Delphinus is another tiny star group, north of Capricorn. The Dolphin can be easily recognized by its compact geometric shape with no other nearby stars to blur the pattern. Aratus relates no myth connected with Delphinus, but Germanicus writes a brief account of the events behind the creation of this constellation. He states that Neptune wished to make Amphitrite his wife; but in shyness she had run away and taken refuge either with Atlas or near Mount Atlas. The compassionate Delphinus, "taking pity on a lover," found her, convinced her of Neptune's sincerity, and carried her back to wed Neptune. In gratitude for this service, the god transported the little Dolphin to the heavens. When represented in artworks, Neptune is often pictured with his favorite tiny Dolphin either in his hand or under his foot. In the head of Delphinus are four stars, equal in brightness, arranged in a parallelogram or a diamond, with a total number of stars reaching nine.

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555 During the reign of Hadrian, an attempt was made to form a constellation out of six or seven stars in the lower section of Aquila. The newly formed constellation was called Antinous, in honor of the Emperor's lover who had drowned as they were sailing on the Nile. The constellation of Antinuous persisted until the late eighteenth century, but these stars have now been reassigned back to Aquila.

THE ORION GROUP: ORION, the DOG, the HARE and ARGO (322-352)

At this point in the *Phenomena*, Aratus begins the transition to the stars of the Southern Constellations.

33. Orion, the Hunter

> Aslant from the cut-off figure of the Bull lies Orion himself.
> Anyone whose glance misses him when he is positioned
> high up on a clear night may be sure he can never sight anything better
> to identify when he gazes up at the sky. (322-325)

Orion, the great Hunter, is a conspicuous group of bright stars that can without much difficulty be likened to an actual human form with stars at each shoulder, at his feet, with a distinctive three-starred belt. Orion, one of the most-celebrated constellations, appears in the morning hours in September and is due south in December; it is among the easiest star groups to locate in the winter sky. The Egyptians recognized this same star group and associated the constellation of Orion with the god Osirus. The primary Egyptian goddess, Osirus' sister-wife Isis, is associated with Orion's companion, the most brilliant star in the sky, Sirius.

Orion is one of the earliest noted Greek constellations, appearing on the Shield of Achilles along with the Pleiades, the Hyades and the Bear. Orion was the son of Neptune and the nymph Euryale, of gigantic size and strength, and a most handsome hunter with no fear of any animal. It is said that he was so tall that he could walk through the deepest water without getting his head wet. According to one Greek legend, Orion attempted to seduce Pleione, the consort of Atlas, and her daughters, the Pleiades. The women fled, and the gods immortalized their flight by turning Orion and the women alike into constellations, arranged in the sky so that Orion persues his prey for eternity, never reaching them. Some say the gods blinded him, which relates to the very faint stars in his head, making him appear to be sightless. The blinding of Orion was said to occur on Chios, residence of Homer who, according to tradition, was also blind.

In the sky, he is provided with all his needs; Canis Major, his favorite hunting dog at his feet, a Hare to hunt, a sword in one hand and a club in the other. Myths say that Orion died not from hazards of the hunt, but from the sting of the great Scorpion, for which he was given an antidote by Ophiuchus/Asclepius. As mentioned with Scorpio, when Ophiuchus sets in the West, Orion rises in the East fully recovered. Germanicus expresses, "No other constellation more accurately represents the figure of a man than the stars scattered throughout his body". In *De astronomia*, Hyginus relates two versions of the Orion myth, in one he is mortal and in the other immortal. The bright stars of Orion can be utilized as guides, a line drawn downward through the belt of Orion leads directly to Sirius, a line drawn upward points to Aldebaran, the eye of Taurus. The right shoulder of Orion is marked by the brilliant reddish star, Betelgeuse, the twelfth brightest star in the heavens. His left foot is represented by a blue-white star, Rigel, the seventh brightest star. In al-Sˆf′ manuscripts, Orion is called *al-jabbâr* which means 'the giant', and his description says the outlying line of stars are on 'the sleeve of the figure' resulting in a rather bizarre sleeve that is greatly lengthened hanging limply beyond his hand. The total number of stars assigned to Orion is seventeen.

34. Canis Major, the Dog including Sirius

> Such is also his guardian Dog, seen standing on its two legs
> below the soaring back of Orion, variegated, not bright over all,
> but dark in the region of the belly as it moves round;
> but the tip of its jaw is inset with a formidable star,
> that blazes most intensely: and so men call it the Scorcher.
> When Sirius rises with the sun, trees can no longer outwit it
> by feebly putting forth leaves. For with its keen shafts it easily pierces
> their ranks, and strengthens some, but destroys all the growth of others.
> We also hear of it at its setting. The other stars
> lying round about Sirius define the legs more faintly. (326-337)

Canis Major, Orion's faithful dog, sits to the southeast at the feet of the great hunter; this constellation's most brilliant star Sirius, in fact the brightest star in the sky, marks the dog's jaw,

fainter stars form the rest of the body. His loyal dog follows the mighty Orion as he passes across the sky, just as he had followed him on the hunt. In some instances, Sirius denotes destruction since it brings the scorching heat of mid-summer that devastates crops. The Dog-star Sirius was particularly important to the Egyptians, as its heliacal rising announced the time of the annual flooding of the Nile, as well as the hottest time of the year, the dog-days of summer. The earliest Greek reference to this constellation as Orion's Dog is found in Homer, although he may be referring to just Sirius not the entire constellation. The entire constellation of Canis Major holds nineteen stars.

35. Lepus, the Hare

> Under the two feet of Orion, the Hare is hunted constantly all the time:
> Sirius moves forever behind it as if in pursuit,
> rises after it and watches it as it sets. (338-341)

Lepus, the Hare, is found below the feet of Orion and is constantly watched and persued by Sirius, says Aratus. This constellation was probably created to complete the hunting theme associated with Orion. Lepus is a tiny star group, designed to face west as if running ahead of the stars of the Dog constellation. Later mythographers tell that Mercury himself placed the little Hare among the constellations because of its swiftness. The number of stars comprising the small constellation of Lepus is only seven.

36. Argo or Navis

> Close to the great Dog's tail is Argo towed stern first.
> Its course is not that of a ship proceeding on its normal business,
> but its movement is backward-turned, like that of real ships
> when the sailors have already turned the stern about on entering harbor;
> all the crew quickly back water, and the ship surging astern makes fast to the land.
> So this Argo of Jason is towed stern first. Dark and starless
> from the prow as far as the actual mast she goes, but the rest is all bright.
> The steering-oar is detached and set fast under
> the Dog's hind legs as it runs ahead. (342-352)

Argo or Navis, the imaginary ship in the sky, is found below Canis Major and according to Aratus, proceeds backward like a ship 'entering harbor', its stern turned by the sailors. The

constellation of Argo was not entirely visible from Greece, as it lies entirely in the Southern Hemisphere, covering an enormous portion of the sky. Navis appears to have no bow, as that area of the sky is dark, only the stern is represented by its stars; and so like Equus, Pegasus and Taurus comprises only half a figure. Hyginus states that the sight of half a ship would encourage seafarers not to fear shipwrecks. This ship of mythology is associated with the vessel built by Argos which carried his expedition in search of the Golden Fleece manned by Jason and the Argonauts, the fifty famous Greek heroes. Some say it was called Argo because of its speed, or that its builder was Argus who used special wood for its construction. Through time, the Argo aquired a supernatural quality; and it became endowed with speech through a speaking plank that was added by Minerva. In classical literature, this magical ship had in its prow a special piece of wood from the sacred oak groves of the oracle of Zeus at Dodona. This extraordinary plank could not only speak, but could even see into the future. Argo was considered the first ship to cross the untraversed sea. Germanicus tells that the Argo was damaged as it passed between the treacherous Symplegades, the Clashing Rocks. After the sea voyage had accomplished its mission, Athena placed the great ship in the sky to immortalize it.

Another association connected with the great ship Argo is its similarity with the story of Noah and the Flood, a tale common to many different cultures. Argo is sometimes shown beached on a mountain, in a manner similar to the Ark. Near to the Ship in the sky is the Centaur sacrificing a Beast upon the Altar, and the Water-Snake with Corvus eating its flesh, all elements found in versions of the Flood myth. Navis is no longer recognized as a single constellation today; it has been broken up into three smaller constellations. The total number of stars in the ship Argo was twenty-seven, three stars in a line constituted the upright mast; its brightest star is Canopus.

ιSEA-MONSTER GROUP: the SEA-MONSTER, the RIVER, the SOUTHERN FISH (353-401)

37. Cetus, the Whale or Sea Monster

> Although she lies no small distance away, Andromeda is threatened by the approach of the great Sea Monster. For in her course she lies exposed to the blast of the north wind from Thrace, while the southerly brings against her the hostile Monster, below the Ram and the two Fishes, and positioned a little above the starry River. (353-358)

The sinister sea monster Cetus crawls low in the sky over the southern horizon in September and October, threatening Andromeda. Cetus demarcates the Celestial Equator, its sinister head protrudes above the Equator; and its elongated, bulky body stretches out south of the Equator. Cetus is amphibious and consists of a group of stars that make up its the head, a body group and a tail, with the Fishes' Knot close to its back fin. Though sometimes called the Whale, it was more likely based on a fictitious sea monster of myths and legends. Cetus was sent by Poseidon to provoke King Cepheus, when his boastful wife Cassiopeia claimed to rival the Nereids in beauty. Living deep in the dark waters of the sea, Cetus would have devoured Andromeda, if she had not been rescued by her hero Perseus. The frightful monster came to symbolize all the evils of the world; sin, immorality, hatred and envy. The monstrous beast was placed in the sky not to reward him, but to commend the courage of Perseus in destroying him. Cetus lives in the realm of the sky where all its adjoining constellations have some association with water. Eridanus the Great River; Pisces the Fishes; Aquarius the Water-Bearer; Capricorn the Sea-goat; and Piscis Austrinus, the Southern Fish, all inhabit this area of the celestial sphere. In artistic renderings, Cetus sometimes resembles a sea-dragon, or alternatively is pictured with the head of a dog and the body of a fish. The number of stars included in this constellation is

thirteen.

38. Eridanus, the River

> For under the gods' feet, that too moves as a separate group,
> a remnant of Eridanus, river of much weeping. It extends
> below the left foot of Orion.The tail-chains, by which the extremities of the Fishes
> are held, both come together as they descend from the tail-parts,
> and behind the Monster's back-fin move jointly
> [365] as they converge, and terminate in a single star
> that lies close to the top of the Monster's spine. (359-366)

The River called Eridanus is formed by a long course of dim stars, winding west from Orion's foot; it curves round to flow east, then west again and south. Its origin seems to be Greek since neither Babylonian nor Egyptian myths speak of a river in this section of the sky. Hyginus associates this river of stars with the Nile since, viewing it from Greece, appears in the direction of Egypt, in addition, it flows from the south to the north like the Nile. Several variations of its name appear in myths, sometimes it is referred to as Flumen or Flumena, Germanicus calls it Amnis.

The River Eridanus is featured in the tale of Phaethon, the son of Helios, who was thrown from the Sun Chariot and fell into the River, where he drowned. Eridanus became a 'river of much weeping' as the tears of Phaethon's sisters, the Heliades, flowed into the Eridanus and were transformed into drops of amber. The constellation of Eridanus is always drawn as a personification, a reclining river god holding a vessel that flows with water, rather than as an actual flowing stream of water. This manner of depicting a river is a classical convention taken over from antique models, and continues through the Middle Ages. The River is composed of thirteen stars, three at the first bend, three at the second and seven spread out from the third bend to the last one.

At this point of the poem, Aratus renews his discussion of the constellation Pisces. Chains from the tails of Pisces 'converge' and 'terminate' at line 365 and 1/4, the exact length of

a year. They 'converge' in a 'single star', **the Knot**, the first indication of the sun's precessional movement from the Age of Aries into the Age of Pisces, this occurred in approximately 2000 BCE.[556]

39. The Southern Fish, Piscis Australis

> Below Capricorn and exposed to the winds of the
> south hovers the Fish, turned to face the Monster,
> distinct from the former two: they call it the Southern Fish. (386-388)

The Southern Fish is a single, unattached fish in the southern sky, distinct from the two joined fish of Pisces located in the north. Aratus supplies just its position, orientation and name. This great Fish is often illustrated with its mouth open, taking in the water pouring from the jar of Aquarius. In constellation cycles, it is drawn in a similar manner to Pisces, but usually a bit larger. Germanicus says, "There is a fish that swims alone, apart from the twin fishes". Hyginus identified this single Fish as the one which rendered a special kindness to the Egyptian goddess Isis. In return, Isis secured a place in the heavens for it, and the twin fishes of Pisces are thought to be its offspring. This constellation consists of twelve stars in all.

The Water

> Other stars lying scattered below the Water-pourer hang in the sky
> between the celestial Monster and the Fish, but they are faint and nameless.
> Close to the, like a light spray of water being sprinkled this way and that
> from the right hand of the illustrious Water-pourer, some pale and
> feeble stars go round. Among them go two rather brighter stars,
> not so very far apart nor yet very close, one beautiful and bright star
> beneath the feel of the Water-pourer, the other below the dark Monster's tail.
> Men call them collectively the Water. But a few others below the Archer,
> under his forefeet, are curved in a ring as they go circling round. (389-401)

This area of faint stars does not give rise to any recognizable figure, therefore it is not considered a constellation, and is not illustrated. Aratus simply calls this area the Water. Cicero

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[556] For more information on this topic, see G. De Callatay, "The Knot of the Heavens", *Journal of the Warburg and Courtauld Institutes*, Vol. 59, (1996) 1-13.

and Avienus follow Aratus in describing the group as Aqua, but Germanicus omits the name entirely.

ιTHE ALTAR GROUP: ALTAR, CENTAUR, the BEAST, HYDRA, the BOWL, the RAVEN, and PROCYON (402-451)

40. The Altar or Ara

> Now below the blazing sting of the great monster Scorpion,
> Close to the south hovers the Altar. This constellation you will observe
> only for a short time above the horizon, for its period of visibility is
> the opposite of Arcturus'. In fact the paths of Arcturus come fully overhead,
> whereas the Altar goes quickly under the western sea.
> Yet even round that Altar ancient Night, sad for the suffering of men,
> has set an important sign of storm at sea; for ships in distress
> are not to her liking, and she displays different signs in different ways
> in her pit for storm-tossed men. So pray, I beg you, that at sea
> this constellation be not visible in mid-sky overarched by clouds,
> everywhere else, cloudless itself and brilliant, but higher up
> oppressed by billowing clouds, as they are often packed
> when an autumn northerly piles them up. (402-417)

The Altar is found below 'the great monster Scorpio', far south; not fully visible above 23 degrees of latitude and shines for only a brief period above the horizon, as mentioned by Aratus. Ara lies only a short distance from the southern horizon, therefore it is difficult to pick out because of haze, clouds and the unsteadiness of the atmosphere. Ara, a winter constellation, is a sign of storms when seen 'overarched by clouds', put there by Night to guide sailors and 'storm-tossed men'. Aratus gives the Altar a large portion of space in his poem, more lines than would be expected for its minimal importance as a constellation, but the gods of Olympus needed an Altar to swear allegiance to Jupiter. The Leiden *Aratea* pictures the Altar as a tripod censer with incense burning. Other illustrations of Ara usually show fire rising from the altar, as it was filled with burning incense, the smoke usually drifts to the north, represented by the soft,

hazy whiteness of the Milky Way. Germanicus describes the burning altar as one of the signs that Nature has given man for protection. Ara is a small constellation with only four stars, two at the top and two at the bottom.

41. Centaurus, the Centaur

> If the Centaur's shoulder should be as far from the western horizon
> as from the eastern, and a slight haze shroud the constellation,
> while behind it Night is fashioning recognizable signs on the radiant altar,
> you must certainly be on the lookout not for a southerly
> but for an easterly wind. You will find this constellation lying below two others:
> part of it, resembling a man, lies beneath the Scorpion, and the Claws have
> the horse's hind-part under them. He looks as if he is always stretching
> his right hand towards the round Altar, and fast in his hand is tightly gripped
> another constellation, the Beast; for so our predecessors named it. (431-442)

The Centaur is a large and shapeless constellation in the southern section of the sky, occasionally identified with Chiron, the best-known Centaur. Chiron was immortal, while other centaurs were said to be mortal. Chiron has a reputation for wisdom and justice, loving music and art, he was supposed to have tutored Asclepius, Achilles and many other important figures. He was not only their teacher, but friend and advisor. Attitudes toward centaurs and their reception in the Middle Ages is the subject of an article in which the author discusses hybrid creatures. The author reports that 'in Greek and Latin literature Chiron is considered an outsider in the family of centaurs'. 'Other centaurs are portrayed as retarded barbaric brutes, Chiron is a wise tutor.'[557]

Sometimes the Centaur tends to be confused with Sagittarius, but he holds 'the Beast' in his hand rather than the bow and arrow indicative of Sagittarius. The human or front-half of the Centaur lies below Scorpio and the horse-like hind quarters are found below Libra, 'the Claws',

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[557] Ludo Jongen, "Do Centaurs Have Souls?" in *Animals and the Symbolic in Mediaeval Art and Literature*, L.A.J.R. Houwen, ed. Egbert Forsten (1997) pp. 139-154.

his right hand points toward the Altar. The wild 'Beast' gripped tightly in his left hand is depicted more like an unbeastly rabbit, Lupus. The animal that he is sacrificing is a manifestation of his piety; its shape is actually square. Some say this is a wine skin from which he is pouring a libation on the Altar. The Centaur died when talking with Hercules; because one of Hercules' arrows slipped from his quiver and struck Chiron on the foot. The al-Sufi manuscript illustrates the Centaur in the Western manner, but the 'thyrsus' or spear wreathed with vine leaves usually held by this figure has become simply a bunch of leaves. The Centaur has a large number of stars, totaling twenty four, the sacrificial offering or the 'wild beast' that he holds has ten.

42. Hydra, the Snake

> But yet another constellation sweeps across the horizon:
> they call it the Hydra. Like a living thing it winds at great length,
> its head comes below the middle of the Crab, its coil under the Lion's body,
> and its tail hangs over the Centaur himself. (443-447)

Hydra is a lengthy series of stars, stretching roughly parallel to the ecliptic, with one bright star of second-magnitude, six of third-magnitude and nine that are only fourth-magnitude. Hydra slithers low on the horizon below Libra, Virgo, Leo and Cancer. The last four constellations are closely related and the three, Hydra, Crater, and Corvus are always combined into one illustration. All three constellations are linked together in a well-known myth of Apollo. The god sent a raven, said to be one of his servants, to fetch a cup of pure water for a sacrifice. The bird became distracted by a fig tree and waited for the figs to ripen in order to eat them. When he finally returned to Apollo, the raven brought along a snake and claimed that the snake had prevented him from getting the water from the spring. The legend states that Apollo punished the tardy raven by making it unable to drink in springtime. Aratus describes Hydra accurately for it is quite long, a winding snake 'like a living thing' lying with its head below the Crab, its coil below the Lion, and its tail over the Centaur.

Hydra is also associated with the myth of Hercules, as the snake he had to combat, one of his Twelve Labors. The snake had nine heads, every time Hercules chopped off a head, two new ones grew. Eventually, Hercules burned the stump of each decapitated head to prevent the new ones from growing. Juno made Hercules task more difficult by sending a Crab, Cancer, after him, which can be seen in the sky above the snake's head. Hercules crushed the Crab under his feet. When the Sun rises in Cancer, the head of Hydra also rises, meaning that Hercules has managed to cut off the first head, because the stars of Hydra begin to fade in the morning light. This goes on until the end of October. This lengthy transit is symbolic of the long battle of Hercules, as he overpowered the snake bit by bit. Every time Hercules cuts off another head, a little more of Hydra disappears in the morning sunlight. Hydra includes twenty-seven stars visible to the naked eye, a straggling collection of faint stars not worthy of a constellation figure, but important as it designates the celestial equator.

43. Crater, the Cup or the Bowl

On its middle coil lies the Bowl, and on the last one (448)

Crater is actually shaped like a cup and has ten stars.

44. Corvus, the Raven

the figure of a Raven that looks like one pecking the coil. (449)

Crater and Corvus are small constellations, but distinct, and depicted in illustrations as actually standing on the Hydra. The combination was probably invented by the Greeks, since the Raven is an attribute of Apollo. Once Corvus had white feathers and a beautiful singing voice, but lost these as punishment for not following the orders of Apollo. The god changed his shiny white feathers into dirty black ones and altered his voice to a dull screech. As they were immortalized, Hydra was to make sure that Corvus never reached the Beaker to quench his thirst. The Crater always remains well in front of Corvus. Corvus has a total of seven stars.

45. Procyon, or Canis Minor

> Yes, and there too Procyon shines brightly beneath the Twins.
> These you can see as the years pass returning in succession;
> For these figures of the passing night are all well fixed
> in the sky just as they are. (450-453)

Procyon, the second dog in the sky, is the name of both the constellation and a single bright star within it. Procyon is located just below Castor and Pollux, a short distance to the west of Hydra's head, behind the shoulder of Orion. The Lesser Dog was important in ancient calendars as the forerunner of the Greater Dog, Canis Major and its primary star Sirius, both are associated with the hottest time of the year. Aratus and Germanicus mention only a single star of this constellation, Procyon, the "Forerunner of the Dog", its name derives from the fact that it rises one hour before Sirius. Canis Minor has one first-magnitude star, the total number is three.

This completes Aratus' description of the northern and southern constellations.

The Iconography of the Sun, Moon and Planets

The planets are mentioned by Aratus, but not listed by name. They are not relevant to his purposes as they provide no practical use for measuring time or predicting the change of seasons. Since the sun and moon are relevant, they are discussed in the final section of the poem, especially 778-891. In his poem, Germanicus does name the five planets, and also discusses the Four Seasons.

The Planets

> But there are five other stars among them that circulate
> all the way through the twelve figures of the zodiac.
> You cannot in this case identify where these lie by looking at other stars,
> for they all change their positions. The years of their orbits are long,
> and at long intervals are their configurations when they come
> from afar into conjunction. I am not at all confident in dealing with them:
> I hope I may be adequate in expounding the circles of the fixed stars
> and their guide-constellations in the sky. (454-462)

Helios, the Sun God

The brilliant Sun God, Helios, was the supreme cosmic power, the symbol of light and truth, identified with Apollo. The golden young man, portrayed beardless with the ideal form of the physical male body in the prime of life, brought light to the darkest corners of the world. The Sun God ripens the fruits of the fields, but his beneficence can scorch and burn as well. His iconography often shows him encircled as if enclosed in the fiery sun disc. Crowned with light rays and holding a torch, the powerful god, his billowing cape lifted by the wind, steers the Sun Chariot pulled by four mighty horses bringing illumination and invigorating life.

Luna or Selene, the Moon Goddess

The Moon had many mythological aspects, usually as the female consort to the Sun, just as powerful but in a passive role, as her silvery light is but a reflection of the sun's golden light. Luna's influence operated principally at night, and the waxing and waning of her monthly phases evoked growth in plants and movement with animals. The Moon symbolized dreams, magic, madness and love, with a close connection with women through their menstrual cycle. Her ebb and flow was powerful enough to move the seas and all of nature with her powerful rhythms. Luna is personified in classical and medieval illustrations as the counterpart of Helios. She controls the path of the Moon through the heavens by directing from her Lunar Chariot pulled by two powerful oxen. Her image is crowned by a crescent moon or the horns of a cow, and she holds a pale torch. The three days when the moon is dark is the archetypal period of the descent of the hero to the underworld, from which like the moon, he arises reborn.

Mercury

The visual appearance and motions of each planet indicate how a symbol and its iconography were generated. Mercury/Hermes appears as a tiny point of light that moves in a

rapid, tight loop always close to the Sun. Mercury is the personification of a nimble mind, sharp wit, with skill in communication and speech. As the messenger of the gods, he kept them informed of the events in the world. Chameleon-like, he symbolizes the mercurial aspects of humans, a restless youth picking up and dropping whatever might come his way. His emblem is the caduceus, a rod denoting all the skills of information, from magic to mathematics. He often wears a brimmed hat and winged sandals. He was a bright messenger of cunning and irresponsibility.

Venus

Venus, the brightest planet, appears in the sky as the morning star, sometimes called Lucifer (bringing the light) or the evening star, Vesperis, never straying far from the Sun. The archetypal image of Venus/Aphrodite is a powerful, attractive and alluring young woman. Her attributes were the power of instinct, pleasure and sensuality. She abhorred deprivation and ugliness preferring luxury, comfort and all beautiful things. Venus often appears naked to show off her curvaceous body and long flowing hair, sometimes depicted admiring her image in a mirror.

Mars

The planet Mars/Ares glows fiery red in the night sky, and as a result is usually cast in the role of the god of war. Mars is depicted as energetic, disciplined and powerful, armed and ready for battle. His gift is courage with a concern for judgement, discipline and justice.

Jupiter

The largest and most majestic of the planets, Jupiter/Zeus is the venerable king of the gods and the benefactor of humanity. Like all of the other gods, he had positive and negative aspects. He could bestow favors or throw thunderbolts with equal zeal, but could not control his

wife. He was magnanimous, aiding humanity and nations to become great.

Saturn

The slowest and most distant planet known in antiquity, Saturn/Chronos was the god of time, the destroyer. His deliberate and lengthy period of orbit gave him the image of an old man, characterizing age, rigidity and gravity. His emblem, the scythe, not only cut away time, but also cleared away the old and useless parts of life. Since he was the least erratic of the planets, Saturn was recognized for constancy and dependibility, known for endurance and the rewards of hard work. The wisdom of old age made him the distinguished teacher of the young, demanding but just. Originally the king of the solar system, he was banished by Jupiter to the outer realms of the universe, and sometimes personifies melancholia and depression.[558]

[558] See Panofsky and Saxl, *Dürers, Melancolia I: eine quellen- und typengeschichtliche Untersuchung*, Studien der Bibliothek Warburg,, II. Leipzig, 1923

BIBLIOGRAPHY

Primary Sources

Astronomical and Astrological Manuscript Editions and Translations

Al-Bitrûjî: *De motibus celorum*. Critical Edition of the Latin Translation of Michael Scot, ed. Francis J. Carmody, Berkeley: University of CA Press, 1952

Aratus. *Aratos, Phénomènes*, Texte, établi, traduit et commenté Jean Martin, 2 vol. Paris: Les Belles Lettres, 1998

Aratus. *Aratus Phaenomena:* Douglas Kidd, Intro., Translation & Commentary, Cambridge 1997

Aratus. *Phaenomena*. trans. G. R. Mair, Loeb Classic Library, Cambridge: Harvard University Press, 1969

Avienus. *Rvfi Festi Avieni Carmina*, Alfred Holder, ed. Georg Olms Verlagsbuchhandlung: (Rep. Hildesheim 1965), 1887

Avienus. *Les Phénomènes d'Aratos*, texte établi et traduit par Jean Soubiran, Paris: Les Belles Lettres, 1981

Bede. *Bedae, Opera De Temporibus*, C.W. Jones, Cambridge: Medieval Academy of Amer. 1943

Bernard Silvester. *Cosmographia*. trans. Winthrop Wetherbee. NY: Columbia Univ. Press, 1973

Cicero. *Cicéron. Les Aratea*. ed. V. Buescu, Bucharest (Rep. Hildesheim 1966), 1941

Cicero. *Cicéron: Aratea Fragments Poètiques*, ed. Jean Soubiran, Paris: 1972

Germanicus. *Aratea, Kommentar zum Aratus des Germanicus, MS. Voss. Lat. Q.79* Bibliotheek der Rijksuniversiteit Leiden, Faksimile Edition and Commentary, 2 volumes, B. Bischoff, B. Eastwood, T.A.-P. Klein, F. Mütherich and P.F.J. Obbema, Lucerne: Verlag,1989

Germanicus. *The Aratus ascribed to Germanicus Caesar*, D.B. Gain, ed. with introduction, translation and commentary, London: 1976

Germanicus. *Germanici Caesaris Aratea cum scholiis*, A. Breysig, ed. Berlin (Rep. Hildesheim 1967) 1867

Germanicus. Les *Phénomènes d'Aratos*, trans. André Le Boeuffle, Paris; Les Belles Lettres 2003

Hyginus. *Hygini De Astronomia*, Ghislaine Viré, ed. Stutgardiae et Lipsiae: 1992

Hyginus. *Hygin. L'astronomie*. Text établi et traduit par A. Le Boeuffle, Paris: 1983

Lambert of Saint-Omer. *Liber Floridus: Codex Autographus Bibliothecae Universitatis Gandavensis*, ed. A. Derolez and I. Strubbe, Ghent, Bib. Rijksunivsiteit. MS. 92, 1968

London: BL MS Arundel 66, *Liber Astromonicus*, composed by Guido Bonotti (1490)

Lupus of Ferrières, *The Letters of Lupus of Ferrières*, Trans., Introduction and Notes by Graydon W. Regenos, The Hague: 1966

Macrobius, *Commentary on the Dream of Scipio by Macrobius*, Trans., Introduction and Notes by William Harris Stahl, NY: Columbia University Press, 1990

Manilius. *Manili Astronomicon, Liber II*, ed. H.W. Garrod, Oxford: W. Typographeo Academico, 1911

Martianus Capella. *The Berlin Commentary on Martianus Capella's De Nuptiis Philologiae et Mercurii Book I*, ed. Haijo Jan Westra, Leiden: E.J. Brill, 1994

Michael Scotus. *Liber introductorius*, (14th century copy) Munich, Bayer. Staatsbib., MS. 10268

Ovid. *Fasti*, English translation by Sir James George Frazer, NY: G.P. Putnam's Sons, 1941

Sacrobosco (John of). *The Sphere of Sacrobosco and Its Commentators*, trans. L. Thorndike, Chicago: University of Chicago Press, 1949

Catalogues of Manuscript Collections and Exhibitions

Alexander, J. J. G. and Elzbieta Temple. *Illuminated Manuscripts in Oxford Libraries, the University Archives, and the Taylor Institution*. Oxford: Clarendon Press, 1985

Alexander, J.J.G., James H. Marrow and Lucy Freeman Sandler. *The Splendor of the Word*, London: Harvey Miller Publishers, 2005

Apostolic Vatican Library, *Miniatures of the Renaissance*, Vatican City, 1950

Boehm, Barbara Drake and Ji□í Fajt, eds. *Prague: The Crown of Bohemia 1347-1437*, Exhibition Catalog, The Metropolitan Museum of Art, NY: Yale University Press, 2005

Brown University Department of Art. *Survival of the Gods: Classical Mythology in Medieval Art*. Exhibition catalogue. Providence, RI: Brown University Press, 1987

Buonocore, Marco. *Vedere i Classici*: L'illustrazione libraria dei testi antichi dall'erà romana al tardo medioevo, Biblioteca Apostolica Vaticana, Fratelli Palombi Editori, 1996

De Ricci, Seymour. *A Census of Medieval and Renaissance Manuscripts in the United States and Canada*. NY: H. W. Wilson Co., 1935-40. *Supplement*. W. H. Bond, ed. NY: 1962

Fingernagel, Andreas. *Mitteleuropäische Schulen* I, 2 vol: ca.1250-1350, Vien: 1997

Harrsen, Meta P. and George K. Boyce. *Italian Manuscripts in the P. Morgan Library*, NY:1953

Kauffmann, C.M. *Romanesque Manuscripts: 1066-1190*, London: Harvey Miller, 1975

Ker, Neil R. *Medieval Libraries of Great Britain, a List of Surviving Books*, London: 1964

Klemm, Elisabeth. *Die illuminierten Handschriften des 13 Jahrhunderts Deutscher Herkunft in der Bayerischen Staatsbibliothek*, Wiesbaden: 1998

McGurk, Patrick et al. *An Eleventh-Century Anglo-Saxon Illustrated Miscellany: British Library Cotton Tiberius B.V. Part 1, Together with Leaves from BL Cotton Nero D. II, Early English Manuscripts in Facsimile*, XXI. Copenhagen: Rosenkilde & Bagger 1983

New York Public Library, Spencer Collection. *Dictionary catalog and shelf list of the Spencer Collection of illustrated books and manuscripts and fine bindings*

Pächt Otto and J. J. G. Alexander. *Illuminated Manuscripts in the Bodleian Library*, Oxford. 3 vols. Oxford: Clarendon Press, 1966-73

Pellegrin, Elisabeth et al. *Les Manuscrits Classiques Latins de la Bibliotèque Vaticane*, Tome 1, Editions du Centre National de la Recherche Scientifique, Paris: 1975

Pierpont Morgan Library, *Italian Manuscripts in the Pierpont Morgan Library: Descriptive Survey of the Principal Illuminated Manuscripts of the Sixth to Sixteenth Centuries*. NY: 1953

Saxl, Fritz and Hans Meier. *Verzeichnis astrologischer und mythologischer illllustrierter Handschriften des latinischen mittelalters*, 4 parts: *In römischen Bibliotheken* (1915) 2. *Die Handschriften des National-Bibliotek inWein* (1925) 3. two vols. *Manuscripts in English Libraries* ed. Harry Bober, London (1953) 4. *Astrological Manuscripts in Italian Libraries* (other than Rome) ed. Patrick McGurk, London, The Warburg Institute, (1966)

Scott, Kathleen. *Later Gothic Manuscripts*: *A Survey of Manuscripts Illuminated in the British Isles*, vol. 6, London, 1992

Watson, Andrew G. *The British Library; Catalogue of Dated and Datable Manuscript*s, Vol. I & II, Munich: 1997

Zaluska, Y. *Manuscripts enluminés de Dijon*, Paris: 1991

Secondary Sources

History of Astronomy, Astrology and Poetry

Abry, J. H. "Manilius et Germanicus, une énigme historique et littéraire." *REL* 71:(1993)179- 202

Alexander, J. J. G. and M.T. Gibson eds. *Medieval Learning and Literature: Essays Presented to R. W. Hunt*. London: Oxford University Press, 1987

Armstrong, C. A. J. "An Italian Astrologer at the Court of Henry VII" in *Italian Renaissance Studies*; ed. E. F. Jacob, London: (1960) 433-54

Barton, T. *Ancient Astrology*, New York and London: 1994

_____ *Power and Knowledge: Astrology, Physiognomics, and Medicine under the Roman*

Empire. Ann Arbor: 1994

_____ "Augustus and Capricorn: Astrological Polyvalence and Imperial Rhetoric", *JRS* 85: (1995) 33-51

Beede, Grace L. *Virgil and Aratus: a Study in the Art of Translation*, Chicago: 1936

Bellandi, Franco, Emanuele Berti, Maurizio Ciappi. *Iustissima Virgo: Il mito della Vergine in Germanico e in Avieno*, Pisa: Giardini, 2001

Bing, P. "A Pun on Aratus' name in Verse 2 of the *Phainomena*", *HSCP* 93: (1990) 281-85

_____"Aratus and his Audiences." *MD* 31:(1993) 99-109

Bini, Daniele. *Astrologia: art and culture in the Renaissance*, Il Bulino: Modena, 1996

Bischoff, B.et al. *Aratea. Kommentar zum Aratus des Germanicus, MS. Voss. Lat Q. 79* Luzern: 1989

Blackburn, Bonnie and Leofranc Holford-Strevens. *The Oxford Companion to the Year*, Oxford: Oxford University Press, 1999

Blomberg, Mary and Göran Henriksson. "Literary and Archaeoastronomical Evidence for the Origins of the Hellenic Calendar in the Aegean Bronze Age", in *Ad Astra per Aspera et per Ludum*, ed. Amanda-Alice Maravelia, 2003

Blomberg, Peter. "The Early Hellenic Sky Map Reconstructed from Archaeoastronomical and Textual Studies" in *Ad Astra per Aspera et per Ludum*, ed. Amanda-Alice Maravelia, 2003

Bobrick, Benson. *The Fated Sky: Astrology in History*, New York; Simon & Schuster, 2005

Bosch, Lynette M.F. *Art, Liturgy and Legend in Renaissance Toledo*, University Park, PA: Pennsylvania University Press, 2000

Bossong, Georg. "Science in the Vernacular Languages: The Case of Alfonso X El Sabio", in *De Astronomia Alphonsi Regis*, Proceedings of the Symposium on Alfonsine Astronomy held at Berkeley (August 1985), Barcelona, 1987

Burnett, C.S.F. “Arabic into Latin in Twelfth-Century Spain: The Works of Herman of Carinthis”, *Mittellateinisches Jahrbuch* 13: (1978) 100-134

_____ *The Introduction of Arabic Learning into England*, Toronto: University of Toronto Press, 1997

Butzer, Paul L. “Mathematics in the West and East”, in *Science in Western and Eastern Civilization in Carolingian Times*. P.L. Butzer and D. Lohrmann eds. Basel: 1993

Carley, James P. *The Books of King Henry VIII and His Wives*, British Library, 2004

Carmody, F.J. *Arabic Astronomical & Astrological Sciences in Latin Translation,* Berkeley: 1956

Carey, Hilary M. *Courting Disaster: Astrology at the English Court and University in the Later Middle Ages*, NY: St. Martin’s Press, 1992

Chabás, José and Bernard R. Goldstein. *The Alfonsine Tables of Toledo,* Dordrecht: Kluwer Academic Publishers, 2003

Chenu, M.-D. *Nature, Man and Society in the Twelfth Century*. Ed. and trans. L. Little and J. Taylor. Chicago: University of Chicago Press, 1968

Cochrane, Louise. *Adelard of Bath: The First English Scientist*, British Museum Press, 1994

Colish, Marcia L. *Medieval Foundations of the Western Intellectual Tradition 400-1400,* New Haven: Yale University Press, 1997

Cumont, Franz. *Astrology and Religion among the Greeks and Romans,* NY and London: 1912

De Callatay, Godefroid. "The Knot of the Heavens", *Journal of the Warburg and Courtauld Institutes*, Vol. 59, (1996) 1-13

Derolez, Albert. *The Autograph Manuscript of the Liber Floridus, A Key to the Encyclopedia of Lambert of Saint-Omer*, Tvrnholti, Typographi Brepols Editores Pontifich, 1998

Dicks, D.R. *Early Greek Astronomy to Aristotle*, Ithaca, NY: Cornell University Press, 1985

Eastwood, Bruce S. *The Revival of Planetary Astronomy in Carolingian and Post-Carolingian Europe*, UK: Ashgate Publishing Company, 2002

_____ "Origins and Contents of the Leiden Planetary Configuration (MS Voss.Q.79), an Artistic Astronomical Schema of the Early Middle Ages" in: *Viator*, 14 (1983) 1-40

_____ "The Astronomies of Pliny, Martianus Capella, and Isidore of Seville in the Carolingian World." in *Science in Western and Eastern Carolingian Times.* P.L.Butzer and D. Lohrmann eds. (1993) 161-180

_____ "The Diagram *Spera Celestis* in the *Hortus deliciarum*: A Confused Amalgam from the Astronomies of Pliny and Martianus Capella", *Speculum*, Vol. 65, No.4, (1990) 1088-94

_____ "Notes on the Planetary Configuration in Aberystwyth N.L.W. Ms. 735 C, f 4v", *National Library of Wales Journal*, (1981)129-140

Eastwood, Bruce and Gerd Graßhoff. *Planetary Diagrams for Roman Astronomy in Medieval Europe, ca. 800-1500*, Philadelphia; American Philosophical Society, 2004

Edson, Evelyn. *Mapping Time and Space*, UK; The British Library, 1997

Erren, Manfred. *Die Phainomena des Aratos von Soloi, undetersuchungen zum sach-und sinnverstandnis*, Wiesbaden; Franz Steiner Verlag GMBH. 1967

Evans, Michael. "The Geometry of the Mind", *Architectural Assn. Quarterly* Vol.12 No. 4,1980

Faber, Riemer. *The Apostle & the Poet: Paul & Aratus*, Spindle Works, http://spindleworks.com

Fakas, C. *Der hellenistische Hesiod. Arats Phainomena und die Tradition der antiken Lehrepik*. Wiesbaden: 2001

Fantham, Elaine ed. *Ovid, Fasti Book IV*, UK: Cambridge University Press, 1998

Fine, Steven. *Art and Judaism in the Greco-Roman World*, NY: Cambridge Univ. Press, 2005

Flint, V. "The transmission of astrology in the early Middle Ages", *Viator*, xxi: (1990) 1-27

Gee, Emma. *Ovid, Aratus and Augustus: Astronomy in Ovid's Fasti*, UK: Cambridge University Press, 2000

Gee, Emma. Review of Possanza, *Scholia Reviews* ns 14 (2005) 40. On line at: http://www.classics.und.ac.za/reviews/05-40pos.html

Gibson, Margaret and Janet Nelson. editors, BAR International Series 101 *Charles the Bald: Court and Kingdom*. Oxford: British Archaeological Reports, 1981

Gleadow, Rupert. *The Origin of the Zodiac*, London: Trinity Press, 1968

Grant, Edward. “Medieval and Renaissance Scholastic Conceptions of the Influence of the Celestial Region on the Terrestrial”, *Journal of Medieval and Ren. Studies* 17: (1987) 1-23

_____ *The Foundations of Modern Science in the Middle Ages*. Cambridge: Cambridge University Press, 1996

Grant, Edward, ed. *Planets, Stars, and Orbs: The Medieval Cosmos, 1200-1687*. Cambridge: Cambridge University Press, 1996

Green, Steven J. *Ovid, Fasti I, A Commentary*, Leiden; Brill, 2004

Haskins, Charles H. “Science at the Court of the Emperor Frederick II”, *American Historical Review* XXVII, 4 July 1922

_____ *Studies in Mediaeval Science*, Cambridge: Harvard University Press, 1927

Hardie, P.R. “Imago Mundi: Cosmological and Ideological aspects of the Shield of Achilles”, *JHS*, 1985

Heck, Christian. “Iconographie médiévale et héritage antique: la representation des, portes du soleil, dans le calendrier , du psautier de lunel”, *Scriptorium*, Tome XXXV, (1981) 241-261

Henderson, George. “Emulation and invention in Carolingian art”, in *Carolingian Culture*: *Emulation and innovation*. Rosamond McKitterick ed., Cambridge: Cambridge University Press, (1994) 248 - 273

Henriksson, G. and M. Blomberg. “New Arguments for the Minoan Origin of the Stellar Positions in Aratos’ *Phainomena*”, *Astronomy and Cultural Diversity: Proceedings of the International Conference, Oxford VI and SEAC* 99, La Laguna, June 1999

Herbert-Brown, Geraldine. *Ovid and the Fasti: An Historical Study*, UK: Clarendon Press, 1994

Hill, Donald R. "Science and Technology in 9th Century Baghdad" in *Science in Western and Eastern Civilization in Carolingian Times*, P.Butzer and D. Lohrmann, eds. Basel: Birkhäuser Verlag, (1993) 485-502

Hornblower, Simon and Anthony Spawforth. eds. *The Oxford Companion to Classical Civilization*, Oxford: Oxford University Press, 1998

Horsfall, N."Augustus' Sundial:Architecture, Astronomy & Propaganda",*Omnibus* 11:(1985) 5-7

Houts, Elisabeth van. *Memory and Gender in Medieval Europe: 900 – 1200*. Toronto: University of Toronto Press Inc., 1999

Hubert, Jean, & J. Porcher, W. F. Volbach. *The Carolingian Renaissance*, NY: George Braziller, 1970

Hunter, R. L. "Written in the Stars: Poetry and Philosophy in the Phaenomena of Aratus", *Arachnion* 2:(1995) 1-34

Jones, Charles W. *Bede, the Schools and the Computus*, ed. Wesley M. Stevens, Variorum, Ashgate Publishing Limited (1994)

Kibre, Pearl. "The intellectual interests reflected in the libraries of the fourteenth and fifteenth centuries", *Journal of the History of Ideas* 7: (1946) 257-97

Kidd, Douglas, "The Fame of Aratus" *AUMLA* 15: (1961) 5-18

_____ "The Pattern of *Phaenomena* 367-385" *Antichthon* 1: (1967) 12-15

_____ "Notes on Aratus, *Phaenomena*" *CG* 31: (1981) 355-362

Kunitzsch, Paul. "Star Catalogues and Star Tables in Mediaeval Astronomy", in *The Arabs and the Stars*, UK: Variorum reprints, 1989

_____ " The Astronomer Abu 'L-Husayn Al-Sˆf′ and His Book on the Constellations", in *The Arabs and the Stars*, UK: Variorum reprints, 1989

_____"Arabische Astronomie im 8. Bis 10. Jahrhundert" in *Science in Western and Eastern Civilization in Carolingian Times*, P.Butzer and D. Lohrmann, eds. Basel: Birkhäuser Verlag, (1993) 205-220

_____ *Stars and Numbers: Astronomy and Mathematics in the Medieval Arab and Western Worlds*, Burlington, VT: Ashgate, 2004

Laistner, M.L.W. "The Western Church and Astrology during the Early Middle Ages", *Harvard Theological Review* 34: (1941) 251-75,

_____ *Thought and Letters in Western Europe: AD 500 to 900*, NY: Cornell University Press, 1957

Le Bourdellès, Hubert. *L'Aratus Latinus: étude sur la culture et la langue latines dans le Nord de la France us VIIIe siècle*, Lille: Université de Lille III, 1985

Le Goff, Jacques. *Intellectuals in the Middle Ages*, MA: Blackwell Publishers, 1993

Lemay, Richard. *Abu Ma'shar and Latin Aristotelianism in the Twelfth Century*, Beirut: American University of Beirut, 1962

_____ "The teaching of astronomy in medieval universities, principally at Paris in the 14th century", *Manuscripta* 20: 197-217

Levitan, W. "Plexed Artistry: Three Aratean Acrostics, *Glyph* 5: 55-68, 1979

Lindberg, David C. *The Beginnings of Western Science,* Chicago: Chicago Univ. Press, 1992

McClusky, Stephen C. *Astronomies and Cultures in Early Medieval Europe*, Cambridge University Press, 1998

_____ "Astronomies in the Latin West from the Fifth to the Ninth Centuries", in *Science in Western and Eastern Civilization in Carolingian Times,* P.Butzer and D. Lohrmann, eds. Basel: (1993) 139-160

_____ "Gregory of Tours, Monastic Timekeeping and Early Christian Attitudes Toward Astronomy", *Isis*, LXXXI: (1990) 9-22

McKitterick, Rosamond. *The Early Middle Ages 400 – 1000*. Oxford: Oxford Univ. Press, 2001

_____ "Books and sciences before print", *Books and the Sciences in History*, M. Frasca-Spada and N. Jardine eds. Cambridge University Press (2000) 13-34

_____ "Royal patronage of culture in the Frankish kingdoms under the Carolingians: motives and consequences" *The Frankish Kings and Culture in the Early Middle Ages*. Aldershoot: Variorum, Ashgate Publishing Company, (1992) 93-129

_____ "Script and Book Production" in *Carolingian Culture*: *Emulation and innovation*. Rosamond McKitterick ed. Cambridge: Cambridge Univ. Press, (1994) 221-247

_____ *The Carolingians and the Written Word*, Cambridge: 1989

Montgomery, Scott L. *Science in Translation*, IL: University of Chicago Press, 2000

Mostert Richard and Marco Mostert. "Using astronomy as an aid to dating manuscripts: the example of the Leiden planetarium", *Quaerendo*, 20: (1990) 248-261

Munk Olsen, B. *L'àetude des auterus classiques latins aux Xie et XIIe siáecles*, Paris: 1982

Negev, Avraham. *The Archaeological Encyclopedia of the Holy Land*, Third Edition, NY:

Prentice Hall, 1990

Nelson, Janet L. "The Annals of St. Bertin, Charles the Bald: Court and Kingdom", *BAR International Series 101*, London: 1981

_____ *Charles the Bald*, London: Addison Wesley Longman Limited, 1992

Nees, Lawrence. *A Tainted Mantle: Hercules and the Classical Tradition at the Carolingian Court*, Philadelphia, University of PA Press, 1991

Ness, Lester J. *Astrology and Judaism in Late Antiquity*, Diss. University of Miami, Ohio, 1990 Online at: www.smoe.org

Neugebauer, Otto. "The Study of Wretched Subjects" in *The Scientific Enterprises in Antiquity and the Middle Ages*, ed. Michael H. Shank, Chicago: University of Chicago Press, 2000

_____ *The Exact Sciences in Antiquity*, NY: Harper, 1962

Noble, Thomas F.X. "Lupus of Ferrières in His Carolingian Context" in *After Rome's Fall*: *Narrators and Sources of Early Medieval History*, ed. Alexander C. Murray, University ofToronto Press, (1998) 232-50

Noegel, Scott, et al. eds. *Prayer, Magic, and the Stars in the Ancient and Late Antique World*, PA: Penn State University Press, 2003

North, John D. "Astrology and the Fortunes of Churches", *Centaurus* 24: (1980) 181-211

_____ *Stars, Minds and Fate: Essays in Ancient and Medieval Cosmology*, London: The Hambledon Press, 1989

_____ *Astronomy and Cosmology*, Norton History of Science; NY: W. W. Norton & Company, 1994

Ovenden, Michael W. "The Origin of the Constellations", *The Philosophical Journal*, Vol.3: (1966) 1-18

Possanza, D. Mark. *Translating the Heavens: Aratus, Germanicus, and the Poetics of Latin Translation*, NY: Lang Classical Studies, 2004

Possanza, D. Mark. Review of Kidd, (1997) *Bryn Mawr Classical Review* 99.9.1. Online at: gopher.lib.virginia.edu:70/00/alpha/bmcr/99/99-0-1. (1999)

Préaud, Maxime. *Les astrologues à la fin du Moyen âge*, Paris: 1984

Reeve, M. "*Aratea*", in *Texts and Transmission*, L. D. Reynolds, ed. Oxford (1983) 18-24

Rhys Bram, Jean. trans. *Firmicus Maternus, Ancient Astrology -Theory and Practice*, NJ: Noyes Press, 1975

Salzman, Michele Renee. *On Roman Time: The Codex-Calendar of 354 and the Rhythms of Urban Life in Late Antiquity*, CA: University of California Press, 1990

Schumaker, Wayne. *The Occult Sciences in the Renaissance, A Study in Intellectual Patterns*, CA: University of California Press, 1972

Schutz, Herbert. *The Carolingians in Central Europe, their History, Arts and Architecture*, Leiden: Brill, 2004

Schroeder, Chad Matthew. Review of Possanza, *Bryn Mawr Classical Review* 2005.05.20 .On line at: http://ccat.sas.upenn.edu/bmcr/2005/2005-05-20.html

Shanks, Hersehl. *Judaism in Stone*, NY: Harper & Row Publishers, 1979

Shanks, Michael H. *The Scientific Enterprise in Antiquity and the Middle Ages*, University of Chicago Press, 2000

Smoller, Laura Ackerman. *History, Prophecy and the Stars*, NJ: Princeton University Press, 1994

Snodgrass, Mary Ellen. *Signs of the Zodiac: a Reference Guide to Historical, Mythological and Cultural Associations*, Westport, Greenwood Press, 1997

Stevens, Wesley M. *Cycles of Time and Scientific Learning in Medieval Europe,* Aldershot, UK: Variorum,1995

_____ "The Figure of the Earth in Isidore's *De natura rerum," Isis*, 71 (1980) 268 - 277

Stückelberger, Alfred. “Sterngloben und Sternkarten: Zur wissenschaftlichen Bedeutung des Leidener Aratus.” *Museum Helveticum*, 47 (1990):70-81

Tester, S. J. *A History of Western Astrology*, NY: Ballantine Books, 1987

Thorndike, Lynn. *History of Magic and Experimental Science* 8 vols. NY: 1923-58

_____ “Notes on Some Astronomical, Astrological, and Mathematical MSS of the BN, Paris” *JWCI*, 20 (1957) 112-72

_____ “The True Place of Astrology in the History of Science”. *Isis* 46, (1955) no.145

_____ “Peter of Abano: A Medieval Scientist.” *Annual Report of the American Historical Assn. For the Year 1919.*

_____ “Illuminated Science Manuscripts in England.” Ibid

_____ *Michael Scot*, London: 1965

Ulansey, David. *The Origins of the Mithraic Mysteries: Cosmology and Salvation in the Ancient World,* NY: Oxford University Press, 1989

Verkerk, C.L. “*Aratea*: A Review of the Literature Concerning MS. Voss. Lat. Q. 79 in Leiden University Library”, *Journal of Medieval History* 6, (1980) 245-287

Vickers, Brian ed. *Occult and Scientific Mentalities in the Renaissance*. Cambridge: Cambridge University Press, 1984

Viré, G. “La transmission du ‘*De astronomia*’ d’Hygin jusqu’au XIII siècle”, in *Revue d’histoire des textes*, 11 (1981) 159-276

_____ “Les extraits du *de Astronomia* d’Hygin dans les scholies aux *Aratea* de Cicéron”, *L’antiquité classique*, 50 (1981), 801-812

Volk, Katharina. Review of Bellandi, Berti, and Ciappi, *Bryn Mawr Classical Review* 2003.04.29 On line at: http://ccat.sas.upenn.edu/bmcr/2003/2003-04-29.html

Waerden, B. L. van der. *Science Awaking*, Groningen: P. Noordhoff, 1954

Weiss, Ze’ev and Ehud Netzer, *Promise and Redemption: A Synagogue Mosaic from Sepphoris*, Jerusalem; The Israel Museum, 1998

Whitney, Elspeth. *Medieval Science and Technology*, Westport, CT: Greenwood Press, 2004

Wilkinson, John. *From Synagogue to Church: The Traditional Design*, UK: Routledge Curzon, 2002

Zanker, Paul. *The Power of Images in the Age of Augustus*, trans. by A. Shapiro. MI: 1988

Zhitomirsky, Sergey. “Aratus” *Phainomena*: Dating and Analysing its Primary Sources”, *Astronomical and Astrophysical Transactions* 17: (1999) 483-500

_____ “The *Phaenomena* of Aratus, Orphism, and Ancient Astronomy”, *Calendars, Symbols, and Orientations: Legacies of Astronomy in Culture*. European Society for Astronomy in Culture: Uppsala, 2003

Zehnacker, H. “D’Aratos à Aviénus: astronomie et idéologie.” *ICS* 14: (1989) 317-329

Astronomy and Astrology in Art

Bini, Daniele. *Astrologia: art and culture in the Renaissance*, Il Bulino, Modena, 1997

Clark, Vicky. *The Illustrated 'Abridged Astrological Treatises of Albumasar*, dissertation University of Pittsburgh, 1979

Eisler, Robert. *The Royal Art of Astrology*, London: 1946

Gousset, Marie-Thérèse and J.-P.Verdet. *Liber Astrologiae,Georgius Zothoros Zaparus Fendulus*, Paris: Editions Herscher, 1989

Jones, Peter Murray. *Medieval Medical Miniatures*, University of Texas Press, TX: 1984

Katzenstein, Ranee and Emilie Savage-Smith. *The Leiden Aratea, Ancient Constellations in a Medieval Manuscript*, The J. Paul Getty Museum, CA: 1988

Murdoch, John E. *Album of Science: Antiquity and the Middle Ages*, NY: 1984

Page, Sophie. *Astrology in Medieval Manuscripts*, University of Toronto Press, 2002

Stott, Carole. *Celestial Charts*, UK: Smithmark Publishers, 1995

Toscano, G. "Matteo Felice: un miniatore al servizio del re d'aragona di Napoli." *Bollettino d'Arte*, (1995) 93-94

Whitfield, Peter. *The Mapping of the Heavens*, San Francisco in association with the British Library, 1995

Mythology / Mythological Studies

Allen, R. H. *Star Names: Their Lore and Meaning*, NY: Dover Publications, 1963

Cameron, Allen. *Greek Mythography in the Roman World*, NY: Oxford University Press, 2004

Condos, Theony. *Star Myths of the Greeks and Romans: A Sourcebook*, MI: Phanes Press, 1997

De Santillana, Giorgio, and Hertha Von Dechend, *Hamlet's Mill*: *an Essay Investigating the Origins of Human Knowledge and its Transmission through Myth*, Boston: David R. Godin, Publisher, Inc., 1977

Eliade, Mircea. The *Myth of the Eternal Return: Or, Cosmos and History*, trans. W.R. Trask, Princeton University Press, 1954

McDonald, Marianne. *Mythology of the Zodiac*, NY: Michael Friedman Publishing, 2000

Sesti, Giuseppe Maria. *The Glorious Constellations: History and Mythology*, trans. Karin H. Ford, NY: Harry N. Abrams, 1991

Seznec, Jean. *The Survival of the Pagan Gods*, trans. By Barbara F. Sessions, NJ: Princeton University Press, 1953

Stall, Julius D.W. "*The New Patterns in the Sky*", VA: McDonald and Woodward Publishing Company, 1988

Woodford, Susan. *Images of Myths in Classical Antiquity*, UK: Cambridge Univ. Press, 2003

Works of Art and Manuscript Illumination

Alexander, J .J. G. *The Decorated Letter*. London: Thames and Hudson, 1978

_____ *Insular Manuscripts, 6th to 9th Century*, London: 1978

_____ *Medieval Illuminators and Their Methods of Work*. New Haven: Yale University Press, 1992

Alexander, J. J. G., ed. *The Painted Page: Italian Renaissance Book Illumination, 1450- 1550*. Munich: N Y: Prestel, 1994

Backhouse, Janet. *The Illuminated Page: Ten Centuries of Manuscript Painting*, London: The British Library, 1997

_____ *The Illuminated Manuscript*, London: Phaidon Press Ltd. 1986

Backhouse, Janet, D. H. Turner and L. Webster. Ed. *The Golden Age of Anglo-Saxon Art, 966-1066*, exhibition cat. London, BM, 1984

Bischoff, Bernard. *Manuscripts and Libraries in the Age of Charlemagne*, trans. and ed. by Michael Gorman, Cambridge: 1994

Bober, H. "Illustrated medieval school-book of Bede's '*De natura rerum*'," *Journal of the Walters Art Gallery*, XIX-XX , (1956-57) 77-91

_____"The Zodiacal Miniature of the *Trés Riches Heures* of the Duke of Berry - Its sources and meanings", *Journal of the Warburg and Courtauld Institute* 11: (1928) 1-34

Brown, Michele. *Anglo-Saxon Manuscripts,* London: 1991

De Hamel, C.F.R. *A History of Illuminated Manuscripts*. Boston: David Godine, 1986

De Smet, J-M. 'La mentalité religieuse du chanoine Lambert', *Liber Floridus Colloquium,* ed. A. Derolez, Ghent, 11-12, 1987

Dodwell, C. R. *The Canterbury School of Illumination, 1066-1200,* Cambridge Univ. Press, 1954

_____ *Painting in Europe, 800 - 1200,* Harmondsworth: Pelican History. 1971

_____ *Pictorial Arts of the West, 800-1200,* New Haven: Yale University Press, 1993

Dutton, Paul E. and Herbert L. Kessler. *The Poetry and Paintings of the First Bible of Charles the Bald*. Ann Arbor: University of Michigan Press, 1997

Grodecki, Louis et al. *Le siècle de l'An Mil (950 - 1050),* Gallimard, 1973

Haffner, Mechthild. *Ein Antiker Sternbilderzyklus und seine Tradierung in Handschriften vom frühen Mittelater biz zum Humanismus,* Hildesheim: 1997

Köehler, W. and F. Mütherich. *Die karolingischen Miniaturen,* vol. 4: *Die Hofschule Kaiser Lothars,* Berlin: 1971

Kühnel, Bianca. *The End of Time in the Order of Things: Science and Eschatology in Early Medieval Art*, Regensburg: Schnell & Steiner, 2003

_____ The synagogue floor mosaic in Sepphoris: between paganism and Christianity, *From Dura to Sepphoris: Studies in Jewish Art and Society in Late Antiquity*, ed. L. I. Levine and Z. Weiss, RI: 2000, 31-43

Le Berrurier, Diane O. *The Pictorial Sources of Mythological and Scientific Illustrations in Hrabanus Maurus' De rerum naturis,* Diss. University of Chicago, 1978

McGurk, Patrick. "Germanici Caesaris Aratea cum Scholiis: A New Illustrated Witness from Wales", *The National Library of Wales Journal XVIII*, 1973

_____"Carolingian Astrological Manuscripts", in *Charles the Bald: Court and Kingdom*, eds. M.T. Gibson and J.L. Nelson, *BAR International Series 101* Oxford, (1981) 317-332

Muir, Bernard J. ed. *Reading Texts and Images*, UK: University of Exeter Press, 2002

Mütherich, Florentine and J. E.Gaehde. *Carolingian Painting*. New York: George Braziller, 1976

Mütherich, Florentine. "Die Bilder des Leidener Aratus", in *Studies in Carolingian Manuscript Illumination*, The Pindar Press, 2004

_____ "Book Illumination in the Court of Louis the Pious" in *Studies in Carolingian Manuscript Illumination*, The Pindar Press, reprinted in 2004

Nordenfalk, Carl. *Early Medieval Book Illumination*, New York: Rizzoli International Publications, Inc., 1988

_____ "A Tenth-Century Gospel Book in the Walters Art Gallery." In U. McCracken, L. Randall and R. Randall eds. *Gatherings in Honor of Dorothy E. Miner* (q.v.), pp.139-70

Orofino, Giulia. "Il rapporto con l'antico e l'osservazione della natura nell'illustrazione scientifica di età sveva in Italia meridionale", *Intellectual Life at the Court of Frederick II Hohenstaufen*, Studies in the History of Art 44, Wash. D.C.: National Gallery of Art, 1994

Pächt, Otto. *Book Illumination in the Middle Ages: An Introduction*, London: Harvey Miller Publishers, 1984

Panofsky, Erwin. *Meaning in the Visual Arts*, University of Chicago Press, 1955

Panofsky, Erwin and Fritz Saxl, "Classical Mythology in Mediaeval Art", *Metropolitan Museum Studies*, (1933) 228-280

Parrish, David. *Season Mosaics of Roman North Africa*, Rome: G. Bretschneider Editore, 1984

Pérez-Higuera, Teresa. *Medieval Calendars*, London: Weidenfeld & Nicolson, 1997

Saxl, Fritz. "The Revival of Late Antique Astrology", *Saxl Lectures*, Classical Association 1936

_____ "A Spiritual Encyclopedia of the Later Middle Ages." *JWCI* 5 (1942):82-137

_____ "The Belief in Stars in the Twelfth Century", in *Lectures*, 2 vols. The Warburg, 1957

_____ "Illustrated Science Manuscripts in England", in *Lectures*, 2 vols. The Warburg, 1957

_____ "The Revival of Late Antique Astrology", in *Lectures*, 2 vols. The Warburg, 1957

Saxl, Fritz and R.Wittkower, *British Art and the Mediterranean,* The Warburg Institute, University of London, 1948

Schutz, Herbert. *The Carolingians in Central Europe, their History, Arts and Architecture,* Leiden: Brill, 2004

Snyder, James. *Medieval Art,* NY: Prentice-Hall, 1989

Sears, Elizabeth. "Reading Images." in *Reading Medieval Images: The Art Historian and the Object*, edited by Elizabeth Sears and Thelma K. Thomas, 1-7. Ann Arbor, MI: University of Michigan Press, 2002

Temple, Elzbieta. *Anglo-Saxon Manuscripts: 900-1066*, London: Harvey Miller, 1976

Thiele, G. *Antike Himmelsbilder,* Berlin: trans. Hugh Thurston 1898

Toscano, G. "Matteo Felice: unminiatore al servizio del re d'aragona, di Napoli." *Bollettino d'Arte,* 93-94 1995

Vieillard-Troiekouroff, M. "Art carolingien et art roman parisiens; les illustrations astrologiques jointes aux Chroniques de Saint-Denis et de Saint-Germain-des-Pres (IX°-XI° siècle)", in: *Cahiers Archéologiques,* 16 (1966) 77-105

van der Horst, Koert, William Noel, and Wilhelmina C.M. Wüsterfeld, eds. *The Utrecht Psalter in Medieval Art: Picturing the Psalms of David*, London: Harvey Miller Publishers, 1996

von Euw, Anton. “Der Liedener Aratus, Antike Sternbilder in einer karolingischen Handschrift”, exhibition catalog, Munich: 1989

_____ “Die bilder des Leidener Aratus” in *Science in Western and Eastern Civilization in Carolingian Times*, P.Butzer and D. Lohrmann, eds. Basel: Birkhäuser Verlag, (1993)

_____ “Die künstlerische Gestaltung der astronomischen und komputistischen Handschriften des Westens” in *Science in Western and Eastern Civilization in Carolingian Times*, P.Butzer and D. Lohrmann, eds. Basel: Birkhäuser Verlag, (1993) 251-272

Webster, James Carson. *The Labors of the Months in Antique and Mediaeval Art: To the End of the Twelfth Century*, NJ: Princeton University Press, 1938

Weitzman, Kurt. *Ancient Book Illumination*. Cambridge, MA: Harvard University Press, 1959

_____ *Illustrations in Roll and Codex: a Study of the Origin and Method of Text Illustration*. Princeton: Princeton University Press, 1970

_____ *Studies in Classical and Byzantine Manuscript Illumination*. Chicago: University of Chicago Press, 1971

_____ *Late Antique and Early Christian Book Illumination*, N Y: George Braziller, Inc., 1977

Wieck, Roger S. *Painted Prayers: The Book of Hours in Medieval and Renaissance Art.* NY: George Braziller, 1997

Wieck, Roger S., et al. *Time Sanctified: The Book of Hours in Medieval Art and Life*. NY: Walters Art Gallery; distributed by George Braziller, 1988

Wormald, Francis. *Collected Writings: 1. Studies in Medieval Art from the Sixth to the Twelfth Centuries,* eds. J. J. G. Alexander, T. J. Brown and J. Gibbs. Oxford: 1984

Wright, David H. *The Roman Vergil and the Origins of Medieval Book Designs*, University of Toronto Press, 2001

Zarnecki, George, et al. eds. *English Romanesque Art, 1066 - 1200*, Exhibition cat. London: Hayward Gal., 1984

Methodology

Belting, Hans. *Likeness and Presence: A History of the Image Before the Era of* Art. Trans. by Edmund Jephcott. Chicago: University of Chicago Press, 1994

Camille, Michael. "Seeing and reading: some visual implications of medieval literacy and illiteracy." *Art History* 8, no.1 (March 1985): 26-49

Carruthers, Mary. *The Book of Memory: A Study of Memory in Medieval Culture*. Cambridge: UK, Cambridge University Press, 1990

Carruthers, Mary and Jan M. Ziolkowski, eds. *The Medieval Craft of Memory: An Anthology of Texts and Pictures*. Philadelphia: University of Pennsylvania Press, 2002

Kessler, Herbert L. "Reading ancient and medieval art" *Word and Image* 5, no.1, January 1988

Mitchell, W. J. Thomas. *Iconology,: image, text, ideology*. Chicago:Univ. of Chicago Press, 1986

_____*Picture theory: essays on verbal and visual representation.* Chicago: University of Chicago Press, 1994

Panofsky, Erwin. *Meaning in the Visual Arts*, Chicago: University of Chicago Press, 1955

_____*Studies in iconology: humanistic themes in the art of the Renaissance*. 2 ed, Harper Torchbooks, NY: Harper & Row, 1962

Sears, Elizabeth. "Reading Images." in Reading Medieval Images: *The Art Historian and the Object*, ed Elizabeth Sears & Thelma K Thomas 1-7. MI: University of Michigan Press, 2002

Sebeok, Thomas A. *Signs: An Introduction to Semiotics*, Toronto: Univ. of Toronto Press, 1994

Small, Jocelyn Penny. *The Parallel Worlds of Classical Art and Text*, Cambridge, UK: Cambridge University Press, 2003

Yates, Frances Amelia. *The Art of Memory*, Chicago: University of Chicago Press, 1966